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ENTRIES 461–813

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

[Unsigned abstracts are by the editor.]

461. [ANON.] **The reconstruction of elementary botanical teaching. The examination of a witness.** New Phytol. 17: 3–8. 1918.—This and three following communications are discussions of a memorandum under the same general title published by F. F. Blackman, V. H. Blackman, Frederick Keeble, F. W. Oliver, and A. G. Tansley, during the previous month (*New Phytol.* 16: 241–252. 1917.) The anonymous "witness" casts his discussion in the form of an examination by the five authors of the memorandum. He believes that the study of comparative morphology may be made to awaken the student's interest and stimulate his reasoning powers and imagination, and that it provides a solid foundation for work in physiology and applied botany; that ecology cannot profitably be included, except in the most general way, in an elementary course. Rigidity is to be avoided, and a teacher's own interests may suggest the lines on which his teaching may be made inspiring.—*Hazen.*

462. HILL, T. G. [Same general title as Entry 461.] **Some practical suggestions.** New Phytol. 17: 9–12. 1918. The grouping of other subjects to be studied with botany is discussed. The staff of each department of botany should include a chemist and a physicist. The student in physiology should be taught in such a way as to understand and be able to devise apparatus for particular experiments. Practical examinations are advocated.—*Hazen.*

463. JEFFREYS, HAROLD. [Same general title as preceding.] **Ecology as a subject for teaching.** New Phytol. 17: 51–53. 1918. This letter deprecates the inclusion of ecology in an elementary course, on the grounds that ecological research has not advanced sufficiently far to give the subject disciplinary value, and that the descriptive or informational part cannot profitably be studied without extensive preliminary field training, involving at least two summers. An editorial note (by A. G. Tansley) disclaims any intention of the Memorandum to include ecology "as a set subject in an elementary course," but maintains that ecology contributes essential material for the presentation of the conception of plants as living organisms.—*Hazen.*

464. McLEAN, R. C. [Same general title as Entry 461.] **A plea for freedom.** New Phytol. 17: 54–56. 1918. The writer objects to the Memorandum as revolutionary and oppressive, and maintains the opinion that students may be more easily interested in morphology than in physiology.—*Hazen.*

465. Bigelow, Maurice H. **Contributions of zoology to human welfare.** Science **48**: 1-5. July, 1918. Emphasizes contributions to human welfare which biology may make through an education aiming to extend scientific knowledge to everybody, as contrasted with contributions through research and application of knowledge to physical human welfare; includes contributions to (1) intellectual life, and (2) eugenics. Author believes that no phase of biology which has purely physical applications to human welfare, such as bacteria and disease, or biology applied to agriculture, is more important for the *average* educated citizen than a general understanding of the evolutionary theory; hence he urges that our conception of applied biology for general education must be large enough to include intellectual as well as more directly practical aspects which affect human welfare economically and hygienically. Applied biology should be understood in a broad sense as meaning a selection, from the vast field of biological learning, of those facts and ideas which are likely to mean most in the life of the average educated man or woman. He urges an educational movement for eugenics based on a knowledge of biology, not through schools and colleges only, but through lectures, magazines, newspapers, and posters.

466. Kirkwood, J. E. **The practical in education.** Reprint from Inter-Mountain Educator. Jan., 1918. Paper read before Higher Education Section, Montana State Teachers' Assoc. Our most practical subjects are not always those most obviously applicable to economic problems, but those which pertain to the outlook upon life, and cultivate a truer perspective and a better sense of relative values. Illustrations from the field of botany.

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

467. Conard, H. S. **Tree growth in the vicinity of Grinnell, Iowa.** Jour. Forestry **16**: 100-106. Jan., 1918.—In presenting data upon tree growth in the vicinity of Grinnell, Iowa, several facts are brought out in addition to noting the average annual growth increments of several species. There seems to be conclusive evidence that trees are encroaching upon the grasslands, and this is ascribed to the elimination of prairie fires during the past half-century. While this accounts for the present increase of forested areas it is not regarded as explaining the presence of grasslands, which constituted the natural vegetation upon the best soils in the region. The richer soils are very favorable to tree growth and the growth increments are sufficiently large to indicate that timber would prove a profitable crop. Some typical average annual increments are *Carya ovata*, 0.22 inch; *Quercus macrocarpa*, 0.30 inch; *Q. velutina*, 0.29 inch; *Acer saccharinum*, 0.63 inch and *Juglans nigra*, 0.34 inch. [Rev. by Fuller in Bot. Gaz. *66: 542-543. 1918.*]—*Geo. D. Fuller.*

468. Evans, I. B. Pole. **The plant geography of South Africa.** Dept. Agric. Union of South Africa. Official Year Book. 1917. 8 p. *24 pls. 1 map.* 1918.—The very diverse vegetational types of South Africa are classified and mapped, in such a manner as to give an idea of the ecological divisions of the southern part of that continent. The woodland is subdivided into *forest, scrub, bushveld* and *palmveld.* The first of these, which is mostly evergreen, is dominated by species of *Podocarpus*, while the scrub is a type of sclerophyllous shrub, in which the *Proteaceae, Ericaceae* and *Restionaceae* contribute the dominant forms. From this the bushveld differs in its deciduous character and also in its more park-like aspect and its floristic composition. Bushveld is widely distributed and, while dominated by *Acacia* spp., such genera as *Tamarix, Combretum, Ficus, Zizyphus* and *Rhus* are of common occurrence. The palm belt comprises a littoral strip on the southeast, in which palms (as *Mimusops caffra* and *Phoenix reclinata, Raphia vinifera* and *Cocos nucifera*) mingle with succulents from the genera *Aloe* and *Euphorbia.*—The grasslands cover the larger portion of the country, with transitions to scrub and desert. That of the Kalahari region occupies much of the central portion of South Africa, with an open formation of short, low, wiry grasses (such as *Aristida* and *Eragrostis*), occurring in isolated tufts. This and the other grasslands show

transitions to the desert towards the west.—Four distinct desert types are briefly characterized and mapped, perhaps the most remarkable being the southern portion, the vast shallow basin of the Karroo, sparsely populated by succulent, tuberous and bulbous plants. Prominent genera are *Crassula*, *Mesembryanthemum*, *Cotyledon*, *Euphorbia*, *Aloe*, *Stapelia*, *Senecio*, *Encephalartos* and *Euclea*. The paper contains excellent plates which enable one to visualize the different types, and a map showing their distribution. [Rev. by Shreve in Plant World 21: 160. 1918. Also rev. by Fuller in Bot. Gaz. 66: 539. 1918. Also unsigned rev. in Nature 101: 509. 1918.]—*Geo. D. Fuller.*

469. Fernald, M. L. **The contrast in the floras of eastern and western Newfoundland.** Amer. Jour. Bot. 5: 237–247. *8 pls.* May, 1918.—In contrasting the divergent floras of different parts of Newfoundland, Fernald bases his explanation of their differences upon the hypothesis that "the presence or absence of varying degrees of available lime or of other bases in the soil is more fundamental in determining plant distribution than are even considerable differences of temperature and humidity."—The most calcareous and at the same time the most fertile portion of the island is along the west shore, where the ordinary observer would be surprised to find the indigenous flora of the warmest and most mesophytic region of the island, composed very largely of species of far northern distribution, such as *Juncus triglumis*, *Saxifraga oppositifolia*, *S. aizoides*, *S. caespitosa*, *Salix vestita*, *Dryas integrifolia* and *Lesquerella arctica*. These Fernald explains as being from the calcareous habitats of the arctic archipelago and the Canadian Rockies, the lime being hostile to the plants of the adjacent siliceous mainland.—The eastern part of the island, the central tundra district, and the southwest corner, in spite of the fact that these regions are cold, bleak and barren, are populated mainly by plants of the southern Atlantic coast region, with an addition of some like *Calluna vulgaris* and *Pedicularis sylvatica*, from the acid soils of western Europe.—Maps of the distribution of a dozen species give graphic demonstration of the remarkable distribution of some of the more important plants. [Rev. by Fuller in Bot. Gaz. 67: 101. 1919.]—*Geo. D. Fuller.*

470. Hesselbo, Aug. **The Bryophyta of Iceland.** *In*: Rosenvinge, L. K., and Eug. Warming. **The botany of Iceland.** 1^2: 397–676. *39 fig.* 1918.—This is a rather complete account of the bryophytes of the island of Iceland. His annotated list shows 93 species of Hepaticae, 20 of Sphagnales and 325 of Musci. These he further discusses as to their aggregation in communities and their altitudinal and horizontal distribution. [Full rev. by A. Gepp in Jour. Bot. 56: 277–279. 1918. Unsigned rev. in Nature 102: 44–45. 1918. Abst. by Fuller in Bot. Gaz. 67: 104. 1919.]—*Geo. D. Fuller.*

471. Howe, C. D. **Forest regeneration on certain cut-over pulpwood lands in Quebec.** Commis. Conservation Canada, Ann. Rep. 9: 1–15. 1918.—The problems of the regeneration of certain pulpwood forests are discussed. Author finds that, under the usual conditions of cutting, the mixed conifer and hardwood forests of the lower St. Maurice valley are replaced by pure hardwood stands of little value for pulpwood. He deplores the lack of experimental data for the establishment of a system of management which would result in the increased production of the valuable spruce. [Abst. in Exp. Sta. Rec. 39: 145. 1918.]—*Geo. D. Fuller.*

472. Ostrup, Ernst. **Marine diatoms from the coasts of Iceland.** *In*: Rosenvinge, L. K., and Eug. Warming, **The botany of Iceland.** 1^2: 347–394. *Pl. 1.* Copenhagen, 1918.—As a contribution to the botany of Iceland are listed 209 species of marine diatoms collected off the coasts of the island. Of these, about 5 represent new species. Tabular arrangements show distribution, both near the Iceland coast and elsewhere. It is shown that this portion of the coastal flora has strong European affinities. Tables also show the forms characteristically associated with other marine algae and the forms characteristic of different months of the year.—*Geo. D. Fuller.*

473. Skottsberg, Carl. **The islands of Juan Fernandez.** Geog. Rev. 5: 362–383. *20 fig.* May, 1918.—This paper gives an account of a visit to the islands of Juan Fernandez to study

their peculiar flora. Technical report is promised as soon as material collected has been worked over; in the meantime attention is called to the large number of endemic species; mention is made of *Lactoris fernandeziana*, a relative of the magnolias, constituting a monotypic endemic family. Also, the general character of the forest is sketched; it is of the evergreen rain-forest type, similar to that of southern Chile, and contains some Chilean species although dominated by endemics, among which species of *Myrceugenia* and the monotypic palm, *Juanita australis*, are conspicuous. Ferns are abundant, ranging from the large tree type to the minute *Hymenophylla*.—The endemics mentioned include many miniature tree forms belonging to the composite family, and *Gunnera Mas-afuerae*, with leaves ten feet across. [Rev. in Plant World **21**: 161–162. 1918.]—*Geo. D. Fuller.*

GENETICS

Geo. H. Shull, *Editor*

[Unsigned abstracts are by the editor.]

474. Andô, H. **Oomugi no iden ni kwansuru kenkyû. [Studies on inheritance in barley.]** [In Japanese.] Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.] **2**[2]: 1–7. May, 1918.—Following observations are based on individuals derived from natural cross of Canadian race of two-ranked barley with hulled grains loosely arranged on spike. Author found as usual that two-ranked arrangement is dominant to six-ranked. In F_2 the ratio of the two kinds of individuals is 2.5 to 1 (4.3 : 1 according to Tschermak, and 3 : 1 according to Biffen). Author thinks that this ratio is not mere chance deviation from 3 : 1; he assumes one factor *C*, common to both, for development of the six-ranked arrangement, and two factors H_1 and H_2, which, acting together in presence of *C*, inhibit development of side-rows of the spike, thus causing formation of two-ranked arrangement. He further supposes coupling of H_1 and H_2 according to gametic series 13:1:1:13, and thus explains above-stated ratio, 2.5 : 1. In plants derived from cross in question some have hulled, and others naked grains; again, in some they are loosely arranged on spike, while in others very compactly, hulled condition and loose arrangement being dominant to naked and compact ones, respectively. In F_2 of these dihybrids author did not find usual 9 : 3 : 3 : 1 ratio, but quite another 134 : 13 : 13 : 36. He explains this unusual ratio by supposing that factor *A* for hulled grains and *L* for loose arrangement are coupled together according to gametic series 6 : 1 : 1 : 6. Cross of two-ranked barley by six-ranked gave F_1 plants varying notably in respect to shape of side rows.—*S. Ikeno.*

475. Cole, Leon J. **The application of genetics to breeding problems.** School Sci. Math. **18**: 447–454. *6 fig.* May, 1918.—Science of breeding must consist of (1) analysis of hereditary factors involved and (2) manipulation of these in breeding to produce combinations which will give results as expressed in characters. Selection is basis on which all progress in breeding must be made, based on knowledge of factors in materials used. Deleterious effects of inbreeding explainable by theory of "vital" factors whose absence has "lethal" effect. By far greatest number of characters of commercial importance dependent on several to many factors. Such characters must be analyzed, their constituent factors identified and their mode of inheritance determined. Examples, milk and meat production in cattle and immunity to disease.—*E. E. Barker.*

476. Cutler, D. W. **On the sterility of hybrids between the pheasant and the gold campine fowl.** Jour. Genetics 7: 155–165. *1 pl.* May, 1918.—Spermatogenesis proceeds normally until synapsis, and stops here with formation of irregular chromatin masses. No females appeared, though a dozen males were secured. Possibility of pheasant spermatozoa forcing female-producing class of eggs to give rise to males is raised.—*H. D. Goodale.*

477. De Vries, Hugo. **Van Amoebe tot Mensch. From amoeba to man.** *17 × 25 cm. 32 p.* A. Oosthoek, Utrecht, 1918.—In this last lecture of De Vries at University of Amster-

dam, (delivered in Dutch and published in Dutch with complete English translation), he reviews briefly some lines of investigation on heredity and origin of species, emphasizing pangenesis conception of Darwin and himself, which asserts heredity is bound to material particles (gemmules or pangenes) actually transmitted in reproduction. Pangenes are located in chromosomes in definite arrangement as recently determined in Drosophila. Changing influence of these genes under changing environments gives fluctuating variability; appearance of new genes and inactivation or loss of existent genes gives mutational variability, one of main sources of new species and of progressive differentiation in time. Reversions give idea of active and inactive pangenes, latter not necessarily lost as Bateson asserted. Recommends polymorphic groups for observations on species formation; such are violets, roses, *Draba verna*, Oenotheras, etc. Progressive mutations are very rare but loss mutations relatively frequent. De Vries takes exception to authors like Davenport who deny progressive mutation and explain evolution by loss of genes from primitively complex conditions of germ plasm. Mutants *gigas*, *lata*, *scintillans*, considered progressive mutations, because of increase in chromosome number, but author recognizes that convincing criterium of such mutation is still wanting. Investigators of future must find laws of mutation in order that process may be controlled at will.—*J. P. Kelly.*

478. Gates, R. Ruggles. **A systematic analytical study of certain North American Convallariaceae considered in regard to their origin through discontinuous variation.** Ann. Bot. 32: 253–257. April, 1918.—Résumé of a paper to appear after the war. Application of mutationist conceptions to systematic work, i.e., specific differences treated as definite and marked variations rather than as accumulation of small differences with later elimination of intermediates. Species of Disporum distinguished chiefly by presence and absence characters, such as may have arisen as single mutations, and only to minor extent by quantitative characters; *D. trachycarpum* has reticulated fruits while others have them smooth; *D. oregonum* has entire instead of the three-cleft stigma of eastern species; *D. Smithii* and *D. Hookeri* form pair differing respectively by white and green flowers, hairy and glabrous pistil, ciliate and nonciliate leaf margins. Such differences are unlikely to be advantageous and seem result of sudden chance variation which heredity perpetuates and so gives new species; their comparative recency of origin are to be judged by relative areas occupied. Briefly considers also species of Clintonia, Smilacina, Uvularia, Oakesia and Streptopus.—*J. P. Kelly.*

479. Gates, R. Ruggles. **A systematic study of the North American Melanthaceae from the genetic standpoint.** Jour. Linnean Soc. Bot. 44: 131–172. May, 1918.—Author applies to specific and generic differentiation of Melanthaceae the mutation conception of marked or discontinuous variation rather than exclusively the Darwinian conception of gradual differentiation of species. Author recognizes that continuous variations sometimes lead from species to species but claims such are as yet incompletely analyzed and significance unknown despite current belief that "fluctuations" are not inherited. Many cases of discontinuity due to extinction, but many more seem due to definite variation. Existence side by side of related genera with marked differences indicates latter to be not of selective value and mutation theory accounts for such. Triantha differs from Tofieldia partly in having rough pubescence and flowers in clusters of three instead of singly; this might have resulted from two mutations. Pleia is isolated and extinction must have occurred between it and nearest relatives. Filaments of Narthecium bear dense wool probably of no service, originating probably through mutation, persisting through inheritance. Within genus Narthecium specific differences are chiefly small, quantitative, of type which Darwin's theory postulates. Amianthium, Xerophyllum, and Stenanthium are essentially bitypic genera in which species differ largely in having broad or narrow leaves; this indicates possibility of tetraploid mutation or cell-gigantism. Fourteen other genera are listed and discussed.—*J. P. Kelly.*

480. Hodgkinson, Edith E. **Some experiments on the Rotifer Hydatina.** Jour. Genetics 7: 187–192. May, 1918.—Observations were made on 42 families of rotifers, each containing

from 2–17 generations, in order to determine whether pure female-producing families or strains existed. Male-producing females, however, appeared in all of these families either in first or subsequent generations and conclusion was reached that pure female-producing families do not exist.

Rotifers kept in very strong solution of horse manure and fed colorless protozoa which grew in this solution yielded no male-producing females. Their repression was presumably due to influence of the strong horse manure solution. In other experiments rotifers were fed colorless protozoa that grew in the horse manure solution after they had been first thoroughly washed and freed from all of the solution. Very few male-producing females were produced from this feeding, although with removal of inhibiting influence of strong horse manure solution many male-producing females were expected.

In experiments extending through 15 generations in which rotifers were fed colorless protozoa in the horse manure solution about 6 per cent. of individuals were male-producing females, but when diet was changed to one of Euglena in water free from horse manure solution, percentage of male-producing females was changed from about 6 per cent. to about 71 per cent. This high percentage of male-producing females may have been caused: by stimulus of sudden change of diet; by removal of inhibiting influence of horse manure solution; by more oxygen in Euglena solution; or by food itself in Euglena.

Certain lots of rotifers fed on scanty diet of Euglena and other lots on copious diet of Euglena produced about 42 per cent. and about 51 per cent. of male-producing females, respectively. Whether this higher percentage of male-producing females was caused by an increased supply of oxygen or by more food was not determined.—*D. D. Whitney.*

481. Hull, J. E. **Gynandry in Arachnida.** Jour. Genetics 7: 171–181. *1 fig.* May, 1918.—Author brings together eight cases of gynandry among spiders belonging to eight species and two families. Of these, one was observed and described by Hull himself, the others by various writers.—Cases most carefully described he divides into three classes: (1) One side male, other female,—sexual structures perfect except for distortion resulting from union of dissimilar halves on median line; (2) like 1, except that one side is imperfectly developed before, the other behind; (3) one side perfectly female before and male behind, the other perfectly male in front and female behind. To last class belongs example described by author. This displayed typical male characters on right side of cephalothorax, including its appendages, left side being female, while in genital region of abdomen, conditions were reversed.—*F. B. Sumner*

482. Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. April, 1918.—Author deals with gametophytes and fertilization in *Oe. nutans*, *Oe. pycnocarpa*, and their hybrids. Female gametophyte is tetranucleate. In four out of over 500 sections, particles resembling chondriosomes occurred in egg. Twin embryo sacs are common; nothing conclusive as to fate of second embryo sac. Persistency of more than one megaspore considered atavistic. Male nucleus had plasma sheath which is shed before fusion with egg. Occasional presence of more than two male nuclei in embryo sac; author records fusion of one egg with two male nuclei and refers to bearing of this on triploid mutants. *Oe. nutella*, one of the two hybrids between *nutans* and *pycnocarpa*, was self-sterile owing to sluggish growth of pollen tube. [This is repeatedly printed *Oe. nutanella.*]— *J. P. Kelly.*

483. Laughlin, H. H. **Modifications of the 9 : 3 : 3 : 1 ratio.** Amer. Nat. 52: 353–364. June–July, 1918.—Accompanying figures describe experiments chemically paralleling what must happen when F_1 genes develop traits in F_2 somas, in each case of modified somatic dihybrid ratio. Each drawing represents wooden block with holes for holding test-tubes, arranged after manner of Punnett checker-board scheme for illustrating recombination of F_1 gametes into F_2 zygotes. Suitable chemicals are designated for filling gamete-representing tubes, also resulting colors produced when they mix in zygote-representing tubes. All specifications are given for sizes, quantities, etc. for each modified ratio. Section A

presents 16 different di-hybrid ratios which may occur when dominance is complete and segregation normal and independent. Section B illustrates F_2 di-hybrid phenotypic ratio 1:2:1:2:4:2:1:2:1, involving normal segregation with somatic blending, as assumed by Davenport for inheritance of skin color in Negro-White crosses. Section C deals with combination of complete dominance in one factor and blending in other, giving ratio 3:6:3:1:2:1. Author suggests that genes in gametes might be better represented in solid form by chemicals in capsules which slowly dissolve in substratum of zygote.—*E. E. Barker.*

484. Lindstrom, E. W. **Chlorophyll inheritance in maize.** Mem. Cornell Univ. Agric. Exp. Sta. 13. *23 × 16 cm., 68 p., 5 colored pl.* Cornell University, Ithaca, N. Y. Aug., 1918.—Author reports six chlorophyll characters of maize, all simple recessives to normal green, crosses of any two giving green F_1. Two seedling (white, *w*, and virescent white, *v*) and four mature-plant characters (golden, *g*, green striped, *st*, *japonica* striped, *j*, fine striped, *f*). Virescent white changed to yellow and white striped *japonica* to yellow striped in presence of *l*. Aleurone color factor *R* represses *japonica* striping, *r* allowing full development. Normal green is $W\ V\ G\ St\ J\ F$ and L or l. Independent Mendelian inheritance with 9:3:3:1 F results from green F_1 $Gg\,St\,st$, and apparently from $G\,g\,J\,j$, $G\,g\,F\,f$, $J\,j\,St\,st$, $J\,j\,F\,f$, $St\,st\,V_2$; 9:3:4 F_2 from $W\,w\,V\,v$; 12:3:1 F_2 from $V\,v\,L\,l$. Linkage of $G\,g$ with $L\,l$, 19 per cent crossing over; $G\,g$ with $R\,r$, 23 per cent crossing over; $L\,l$ with $R\,r$, no crossing over, regarded as completely linked rather than allelomorphic. Spotting is recessive or partially dominant, mode of inheritance not fully understood.—*R. A. Emerson.*

485. Lippincott, William A. **The factors for yellow in mice and notch in Drosophila.** Amer. Nat. 52: 364–365. June–July, 1918.—Author maintains that the two cases named may be due either to two separate but closely linked genes, one producing the observed somatic effect, the other being a recessive lethal; or to a single gene that produces both effects. He thinks question may be decided by attempting to separate the somatic effects from possibly accompanying lethals by crossing over.—*A. H. Sturtevant.*

486. Miyazawa, B. **Asagao ni okeru ha no iro to hana no iro to no iden. [Inheritance of leaf-color and flower-color in the Japanese morning-glory.]** [In Japanese.] Nôgakukwai Kwaihô. [Report Agron. Soc.] 190: 603–638. June, 1918.—Parents used in hybridization were yellow-leaved (*chlorina*) plants with white flowers and green-leaved ones with flowers of peculiar red color distinguished by its darkness ("kaki-color" in Japanese, very common in flowers of Japanese morning-glory). All F_1 plants made in either reciprocal way are green-leaved and bear flowers of bluish red color, quite a different color from either parent. In F_2 author confirms observations of Takezaki (Bot. Absts. 1, Entry 502), that green and yellow-leaved plants occur in ratio 3:1. Flower color in F_2 was very various, the dark red ("kaki") color is found exclusively in flowers of green-leaved plants and never on yellow-leaved ones, though green-leaved plants do not necessarily bear dark-red flowers, suggesting possible linkage (either coupling or repulsion) between color characters of leaves and of flowers. Author shows however that if flowers are distinguished simply into colored and white ones, green-leaved and yellow-leaved plants segregate, each into 3 colored and 1 white, respectively, giving in F_2, green colored, green white, yellow colored, and yellow white, in usual di-hybrid ratio 9:3:3:1. Author denotes green-leaved parent with dark red flowers by the formula $GGKK$ (G, green leaf-color; K, dark red flower color), and consequently yellow-leaved parent with white flowers by $ggkk$. He thinks that K is able to produce dark red flower-color, only when the accompanying G is in homozygous condition, but produces ordinary red color when G is either entirely absent or in heterozygous condition. Author has confirmed this hypothesis by culture experiments extending to F_4 and also by back-crossing. For instance, F_1 plants have no dark red flowers in spite of their green leaves, because G is then in heterozygous condition, i.e., $GgKk$. Other examples of relation between flower color and leaf color are as follows: $GGKk$, green and dark red; $GgKK$, green and ordinary red; $GGkk$, green and white; $ggKK$, yellow and red.—*S. Ikeno.*

487. MORGAN, T. H. **Concerning the mutation theory.** Sci. Monthly 5: 385–405. May, 1918.—The criticism that mutation theory does not explain evolutionary progress which is apparently continuous is shown to be based on misconception that mutations are necessarily "large" steps. Difference in genetic behavior between usual type of mutation and type originally described for Oenothera seems largely explained by hypothesis of "balanced lethals," which accounts for permanent heterozygosis, for certain small classes simulating mutations, and for twin or multiple hybrids in F_1. Examination of nature of gene as unit of mutation shows that objections to such units furnishing materials of evolution are invalid. A mutant species idea is gaining ground over strict unit character idea because of accumulating evidence of manifold effects of single mutant genes.—*C. B. Bridges.*

488. MORGAN, T. H. **Changes in factors through selection.** Sci. Monthly 5: 549–559. June, 1918.—Significance for the selection theory, of class of mutations known as "specific modifiers," is emphasized. Three criteria by means of which presence of such modifiers can be made probable, and fourth method by which their presence can be demonstrated, are described and illustrated. Proof that certain series of multiple allelomorphs are not examples of close linkage is derived from knowledge of origins of the different allelomorphs. Possible relations of multiple allelomorphs to selection are examined. Implication sometimes made that selection may determine order of appearance of allelomorphs is shown to be groundless.—*T. H. Morgan.*

489. MORGAN, T. H. **Evolution by mutation.** Sci. Monthly 5: 46–53. July, 1918.—Each species is conceived to be product of definite set of co-acting genes which have their present effect as result of series of mutative processes. Relationship between different species is an expression of relatively large number of genes possessed in common. Evidence is fast accumulating that common genes probably undergo analogous mutation in related species, the direction being conditioned by physico-chemical constitution of the gene and not by some hypothetical "directive force." Mutations furnish natural selection with its working material, relatively few producing characters better adapted to available environments than original characters. Bulk of successful mutations are not improbably those of slight somatic effect so that evolution of characters frequently appears continuous.—*C. B. Bridges.*

490. NEWMAN, H. H. **Hybrids between fundulus and mackerel. A study of paternal heredity in heterogenic hybrids.** Jour. Exp. Zool. 26: 391–421. *2 pl.* Aug., 1918.—In Echinoids, inseminations of eggs with sperm of other orders, classes, and even phyla, may be accomplished by chemical means, but no real fertilization reactions occur. Actual hybridization is restricted to species within the order Diademoida. Also in fish, hybridzation is restricted, so far as known, within one order, the Teleostei. Artificial aid is unnecessary in crossing practically all Teleosts. *Fundulus heteroclitus* and *Scomber scombrus* were chosen because the differentiating characters of the larval stages, red chromatophores of Fundulus and green ones of Scomber, adapt this cross to demonstrate facts about heterogenic hybridization. Study of heredity is limited to cross of Fundulus ♀ and Scomber ♂ as all stages to hatched larvae are obtained, while embryos produced by reciprocal die before, or during, gastrulation. Paternal heredity is made obvious by appearance of green chromatophores in hybrid larvae. Hybrids subnormal with respect to apical structures (eyes, heart, etc.), predominate. The more pronounced the abnormality, the greater number of paternal chromatophores present. Conclusion seems justifiable that "in proportion as the paternal element vigorously exercises its functions, in like proportion is development retarded and the various types of monster appear." Most successful embryos are without paternal chromatophores; not result of parthenogenesis, but recovery from disharmonious paternal influence which generally retards development. Large number of eye and heart abnormalities is due to differential inhibition, effect of which, according to Child's "axial gradient" hypothesis, is to induce more abnormalities in apical than in basal parts of embryos. Differential recovery is indicated by occasionally finding embryos with enlarged apical and reduced basal parts, and even isolated eyes and hearts, with rest of egg undifferentiated. These embryos

are usually without paternal chromatophores at least in region of differentiation. These are considered as "differential recovery products," occurring only after prolonged inhibition. Heterogenic hybrids are subnormal, due to active functioning of disharmonious paternal materials. These materials must be eliminated or neutralized in order that proper structural differentiation may result. [Abst. in Physiol. Absts. 3: 457, 458. Nov.-Dec., 1918.]—*R. K. Nabours.*

491. Nohara, S. **Endô no keisitu iden ni tuite.** [**On the inheritance of certain characters in the pea.**] [In Japanese.] Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.] 2^2: 12–14. May, 1918.—**Genetic studies in some characters in Pisum.** Bot. Mag., Tôkyô, 32: 91–102. *2 fig.* May, 1918.—Hybridization of Japanese race of white pea (Japanese name "Siroendo") and French "Sans parchemin très large cosse" (de Vilmorin), both of which produce soft edible pods, has given rise in both reciprocal crosses, to plants with hard inedible pods, hardness being due to the development of parchment-like tissue. Author compares this with production of purple-flowering sweet peas from two white-flowering plants, and thinks that inedible pods are due to meeting of complementary factors *L* and *D*, one of which was present in either parent. This supposition was confirmed by F_2 generation, which contained plants in ratio 9 hard : 7 soft, and further proved by F_3 generation. How these two complementary factors differ from each other is yet unknown.—*S. Ikeno.*

492. Punnett, R. C., and the late Major P. G. Bailey. **Genetic studies in poultry. I. Inheritance of leg-feathering.** Jour. Genetics 7: 203–213. May, 1918.—Crosses were made of Langshan males on Brown Leghorn females and of Hamburg males on Langshan females. Langshans have moderately-feathered shanks, the others are clean-shanked. Feathered shanks are incompletely dominant in F_1. The partial dominance is referred to modifying factors. Ratios in F_2 and various back-matings indicate that feathered shanks are due to single Mendelian factor. In order to bring observations of other workers into line, it is suggested that some booted races may have two factors for feathered shanks while some clean-shanked races may have an inhibitor.—*H. D. Goodale.*

493. Rayner, M. C. **Notes on the genetics of Teucrium scorodonia crispum (Stansfield).** Jour. Genetics 7: 183–186. *1 pl.* May, 1918.—Preliminary note is given of the results obtained in crossing "wood-sage" variety *Teucrium scorodonia crispum* (Stansfield) which is characterized by "crisped" or "crested" leaves, with wild plants of *T. scorodonia.* Plants of *T. scorodonia crispum* used in crossing are vegetative descendants of wild plants found at least 50 years ago and have shown no tendency to revert to normal type. They bear normal flowers and viable seed and produce self-sown seedlings with normal foliage. F_1 plants gave no indication of their hybrid origin. Selfed F_1 plants gave 200 seeds which produced 89 plants with no trace of "cresting." F_1 plants crossed with "crested" grandparent, using latter as pollen parent gave 12 seeds which failed to germinate. Author suggests that seeds carrying "crested" characters may be either non-viable or that seedlings died soon after germination. Experiments must be repeated and extended before correct hypothesis can be founded.—*Richard Wellington.*

494. Richardson, C. W. **A further note on the genetics of Fragaria.** Jour. Genetics 7: 167–170. May, 1918.—Pink-flowering *F. vesca* × white gave approximately 15 : 1 ratio in second generation. Reciprocal crosses between single and double *vescas* produced in F_2 3 : 1, likewise cross "hairy" stems × not hairy.

Evidence presented on sex inheritance showing female dominance. Ratio 9 : 7 resulted by placing sterile flowers with sex to which they appeared to belong, and hermaphrodites and males together. 200 F_1 plants (*virginiana* × *vesca*) flowering in open, gave 4 females and 3 hermaphrodites setting one or two seeds on each plant. Respective crosses *vesca* × *Daltoniana* and *vesca* × *chiloensis* yielded no free-fruiting plants.—*R. J. Garber.*

495. Rickards, Esther, and F. Wood Jones. **On abnormal sexual characters in twin goats.** Jour. Anat. 52: 265–275. April, 1918.—Examination of twin goats having at first the appearance of females but later developing masculine characteristics showed both to be abnormal in that both male and female structures were present in reproductive system. Gross anatomical and microscopic studies were made of organs, drawings of which are presented. Author believes origin of these twins to be monozygotic; that Lillie's theory that abnormally sexed individual is produced by action of sexual hormones developed by other twin is disproved; and that these animals were males, "the external genitalia of which are incompletely masculine at birth, and in which also the usual rudiments of the female internal genitalia are altogether unduly developed." Male gonad is late in exerting its influence, thus producing such abnormal individuals.—*Elmer Roberts.*

496. Robbins, Rainard B. **Partial self-fertilization contrasted with brother and sister mating.** Jour. Genetics 7: 199–202. May, 1918.—A. B. Bruce stated in earlier paper that "for simple cases it will be found if individual matings are worked out in detail that any such hypothesis as continued brother and sister mating, or continued mating of first cousins, can be expressed in terms of a fixed proportion of selfed individuals to individuals mated at random," and assumed this to be a general truth. Author demonstrates that such general assumption is erroneous, for the heterozygous type tends to disappear in continued brother and sister mating, but in a combination of self-fertilization and random breeding the heterozygous type can never disappear. Hence no combination of random mating and self-fertilization can represent continued brother and sister mating.—*J. Detlefsen.*

497. Roberts, Elmer. **Correlation between the percentage of fat in cow's milk and the yield.** Jour. Agric. Res. 14: 67–96. *2 fig.* July, 1918.—Generally accepted that low-yielding cows produce higher percentage fat than do high-yielding cows, though not previously demonstrated by statistical investigation. Wilson suggested independence of yield of milk and percentage of fat, but did not arrange data to bring out relationship. Author's data furnished by registers of American associations and involve study of many individuals of principal breeds. Yearly tests were made from selected individuals, and relation between yield of milk and percentage of fat found by means of correlation tables. Extensive data included in tables A–H and correlation tables I–XXI are for Jerseys, Guernseys, Holstein-Friesians, Ayrshires, grade Jerseys, grade Holstein-Friesians, and some unclassified. Conclusions: Significant correlation between percentage of fat and yield in all except Ayrshires, in which it is signficant only when groups are treated. Yield of milk inercases witb age, though may decrease at some time beyond five years. Percentage fat in Jerseys, Guernseys, and Holstein-Friesians remains fairly constant for ages studied. Variation of percentage butter fat not influenced by age according to standard deviation. On same basis breed has influence on variation of milk yield and percentage of fat. For variability in yield, breeds stand in ascending scale: Jersey, Ayrshire and Guernsey practically together, Holstein-Friesian. For percentage of fat: Holstein-Friesian and Ayrshire about the same, Guernsey, Jersey.—*R. K. Nabours.*

498. Saunders, Edith R. **On the occurrence, behavior and origin of a smooth-stemmed form of the common foxglove (Digitalis purpurea).** Jour. Genetics 7 : 215–228. May, 1918. —Common foxglove (*Digitalis purpurea*) has two distinct forms, *pubescens* and *nudicaulis*, the former being more common. *Nudicaulis* is often found growing with *pubescens* but there is no record of its being found alone. The two forms are alike in all respects except as to surface character; *pubescens* possessing stem gray and densely pubescent throughout and leaves very hairy; *nudicaulis* with stem green, polished and smooth from base to flowering region, where it becomes pubescent, the leaves being less hairy than in *pubescens*. The distinguishing feature of *nudicaulis* is a character common to several other species within the genus, examples of which are given by the author. Both forms are equally fertile, setting seed abundantly and both, when pure, breed true. The origin of *nudicaulis* may be explained on one of the following hypotheses: (1) It may be hybrid—but this is doubtful since F_1

hybrids between the two forms, when selfed, yield 3 : 1 ratio with *nudicaulis* dominant. F_1 hybrids bred back to recessive yield 1 : 1 ratio. (2) The two forms may have had parallel development from common ancestor. (3) *Nudicaulis* may be mutant from *pubescens*—but it is unlikely that dominant mutant should be derived from recessive type. (4) *Pubescens* may be (though more common in occurrence) recessive mutant from *nudicaulis*. According to accepted view we have in *Linaria alpina* similarly, the type in recessive spotted form, and variety in dominant *concolor*. Author found in studying certain abnormal features (1) that peloria and heptandry (two modifications of corolla, both recessive to normal) are inherited independently and (2) that margins of sepals may rarely be thickened and bear structures having appearance of rudimentary ovules.—*M. N. Pope.*

499. Sax, Karl. **The behavior of the chromosomes in fertilization.** Genetics 3: 309–327. *2 pl.* July, 1918.—Description with illustrations of stages in first division of fertilized egg in *Fritillaria pudica* and *Triticum durum hordeiforme.* In Fritillaria no continuous spireme was demonstrable. 12 chromosomes from each parent split longitudinally and 24 chromosomes proceed to each pole. In lower polar nucleus chromosomes become doubled in number, resulting in primary endosperm nucleus with $4x$ chromosomes, $3x$ maternal and $1x$ paternal. No evidence that maternal and paternal chromosome groups remain distinct even in first division. In Triticum separate spiremes are formed by egg and sperm nuclei after latter enters egg. About 14 chromosomes from each split longitudinally, 28 going to each pole. In triple fusion each nucleus contributes 14 chromosomes, and there is evidence that the contributions from the several nuclei may remain more or less separate even in metaphase of first division. In both species first division of zygote is like any other somatic mitosis, and in triple fusion neither shows pairing of chromosomes, and first and following divisions appear to be regular. Author points out that telosynapsis would present difficulties for hypothesis of linear arrangement of genetic factors. He finds no evidence of cytological basis for somatic segregations.

500. Stakman, E. C., J. H. Parker, and F. J. Piemeisel. **Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance?** Jour. Agric. Res. 14: 111–124. *5 pl.* July, 1918.—Barley, which is moderately susceptible, and susceptible varieties of wheat, did not change parasitic capabilities of *Puccinia graminis tritici-compacti* so that it attacks a normally resistant wheat. Continued association with resistant wheat did not cause the rust to attack this wheat more virulently.

P. graminis tritici was used to determine the action of hybrids as bridging forms. Infection capabilities of this rust were not changed on either resistant or susceptible parents after growth on susceptible F_1, F_2 or F_3 hybrid plants.

Bobs, which Pole Evans found immune to stem rust in South Africa was found to be susceptible. Resistance of wheats may vary in different regions because of presence of different biologic forms of rust.—*H. K. Hayes.*

501. Stockard, Charles R., and Geo. N. Papanicolaou. **Further studies on the modification of the germ-cells in mammals; the effect of alcohol on treated guinea-pigs and their descendants.** Jour. Exp. Zoöl. *26*: 119–226. May, 1918.—Data are given on 1170 animals, of which about 900 belong to alcoholic lines (600 with practically no inbreeding, 300 more or less inbred) and rest are controls. The alcoholic lines include immediate and more remote descendants of animals treated by inhaling alcohol fumes. Direct effects of such treatment on subjects was practically nil, but alcoholic lines were inferior to control lines for average size of litter was smaller, conception failed more frequently, early and late prenatal death rates were high, abnormalities were much more frequent, and surviving offspring were smaller and grew more slowly. Mortality in alcoholic lines was high largely because elimination occurred by absorption and abortion of embryos and fetuses. Elimination is thus selective. Progeny closely related to treated stock were inferior but later descendants further removed from treated ancestors are progressively improved. Treating male ancestors for one and two generations as compared with similar treatment of female

ancestors showed worse results in the latter case, presumably because alcohol acted on developing embryos as well as on germ-plasm. Peculiar sex-ratios occurred, suggesting in part differential sex mortalities during early prenatal life, but the case is not entirely clear.—*J. A. Detlefsen.*

502. TAKEZAKI, Y. **Asagao no iden II. [Inheritance in the Japanese morning-glory.]** [In Japanese]. Nippon Ikusyugakukwai Kwaihô. [Rep. Jap. Assoc. Breeding Sci.]. **2**[2]: 7–11. May, 1918.—From ancient times it has been very well known among Japanese gardeners that some strains of Japanese morning-glory (Ipomoea) behave like some strains of Matthiola or Petunia, in that they always segregate into plants with single flowers and those with fully double ones, the latter being completely sterile. Author finds ratio of these two kinds of plants produced by self-fertilization of such a strain of the Japanese morning-glory, is 3 : 1. Hybridization of plants with single flowers derived from this partially double-flowering strain, with plants of the ordinary single-flowering strains, give rise to F_1 plants, all with single flowers. Offspring of some F_1 plants bear exclusively single flowers, while progenies of other F_1 plants segregate into equal numbers of single and of double-flowering. Author concludes that double-producing strain of the Japanese morning-glory is a heterozygote with both eggs and pollen cells of exactly similar factorial composition, which behaves as a simple Mendelian monohybrid, thus being much simpler than eversporting "d-strain" of Petunia, etc., studied by Miss Saunders.—*S. Ikeno.*

503. WEATHERWAX, PAUL. **The evolution of maize.** Bull. Torrey Bot. Club **45**: 309–342. *36 fig.* Aug., 1918.—Review of theories of evolution of maize and morphological study of all parts of plant of three related genera,—Zea, Euchlaena, Tripsacum,—showing the structural similarity of all three groups when vestigial organs are considered. Homology between female and male spike of Euchlaena shown and thereby close similarity between female inflorescence of Euchlaena and that of Zea. Ear of maize considered to be homologue of central spike of tassel. No morphological evidence to show that either was derived by fusion of more simple parts, agreeing with the view of Montgomery and of Collins. No support is given Collins's hypothesis that maize arose through a process of hybridization between Euchlaena and some member of the Andropogoneae. Three genera,—Zea, Euchlaena, Tripsacum,—considered to have independent descent from common, extinct, ancestral form. [Abst. by J. M. C[oulter] in Bot. Gaz. **67** : 104. Jan., 1919.]—*D. F. Jones.*

504. WHITING, P. W., AND HELEN D. KING. **Ruby-eyed dilute gray, a third allelomorph in the albino series of the rat.** Jour. Exp. Zool. **26**: 55–64. May, 1918.—Describes new variety of Norway rat known as "ruby-eyed dilute gray" found near University of Pennsylvania. New variation is recessive to intense pigmentation. When crossed to black-hooded rats all F_1 individuals were intense, and F_2 generation showed 33 intense and 14 dilute. Ruby-eyed dilution is allelomorphic to albinism. The F_2 individuals, called fawns, are intermediate both in hair and in eye color. Fawns when bred together produced eighty ruby-eyed dilutes, 156 fawns, and 80 albinos. Ruby-eyed dilutes crossed with red-eyed yellow rats produce rats of the wild type. Second generation shows evidence of linkage of the two factors, since double recessives did not appear. No linkage is apparent with hooding or with non-agouti.

In agouti dilute sepia pigment is restricted to tips of hairs. Non-agouti are more heavily pigmented.—*F. B. Sumner.*

505. WRIGHT, SEWALL. **Color inheritance in mammals. XI. Man.** Jour. Heredity **9**: 227–240. May–June, 1918.—With respect to color variations in hair, skin and eye of man, only certain rare ones, obviously associated with particular families, depend upon demonstrated unit-factors. Premature grayness, white spotting and albinism belong here. Notwithstanding apparent inheritance of last as a discontinuous variation, no sharp line can be drawn among Europeans between albinism and extreme blondness. There are all grades of imperfect albinos, which may or may not show visual difficulties. View may be safely accepted that albinism in general is due to recessive factors, though no one unit factor is believed to explain all the phenomena.

The ordinary variations in skin, hair, and eye color, are much more difficult to interpret. None of these is obviously discontinuous. All grades between dark brunette and fairest blond are common in persons of British descent. Even with eye color, it appears to author that discontinuity is superficial, there being all grades, depending on amount and situation of pigment. Simple Mendelian interpretations have been attempted, but involve great discrepancies. For example, two blue-eyed parents have been known to have brown-eyed children, which is contrary to theoretical expectations. In general the factor or factors for light eyes tend somewhat more to be recessive than dominant, but no single unit factor seems to be principal cause of differences.

As regards hair color, author believes there is abundant evidence of segregation of some sort. But he also holds that if there is one main factor by which red and light brown differ from black, it must be imperfectly dominant, and that there must be other factors which raise or lower the pigmentation of the heterozygotes from one extreme to the other. Inheritance of skin color, he also believes to give evidence of segregation, though it is impossible to speak of particular Mendelian factors as demonstrated. Thus hair, skin and eye color agree in presence of Mendelian segregation of a complex kind, with dominance tending toward darker types, but probably imperfect as a rule.

Correlation of hair and eye color is treated at considerable length. Familiar association of light hair with blue eyes and dark hair with brown eyes is recognized, but there is still the problem whether this association does not hold merely for races, there being perhaps no such correlation in individuals of a single race. Absence of assortative mating, on such a basis as would account for the correlation between hair and eye color which is found in individuals, is believed proved by analysis of data of Holmes and Loomis. Assortative mating occurs with respect to eye color, but is distinctly negative, i.e., there is shown a distinct preference for a *different* eye color. Author concludes there is no question but that light hair is connected physiologically with light eyes, not only racially but individually.

Particular combinations of hair and eye color are found to be hereditary. This in spite of fact that the parents in population analyzed seem to have preferred to marry those of the color combination most remote from their own.

Author frames provisional hypothesis as to factors concerned in skin and eye color and attempts to compare with similar relations in other mammals. Subject of "color and race" considered briefly, three color races being recognized in Europe: (1) typically blue-eyed, flaxen-haired people around Baltic and North Sea; (2) a "zone of segregating colors," containing various combinations, surrounding this "area of extreme blondism;" (3) outside the latter, the typically brunette populations of southern and southeastern Europe and Asia.—*F. B. Sumner.*

506. Yamaguchi, Y. **Beitrag zur Kenntnis der Xenien bei Oryza sativa. [Contribution to the knowledge of xenia in Oryza sativa.]** Bot. Mag. Tôkyô 32: 83–90. May, 1918.—Well known fact that starch character of ordinary rice (staining blue by iodine) is dominant to glutinous starch (staining red by iodine, owing to its containing amylodextrin). By means of iodine reaction of rice grains themselves as well as of their extracts (by alcohol, ether, water) author was able to distinguish hybrid grains from ordinary rice grains colorimetrically. Hydrolysis of extracts by certain acids shows that quantity of invert-sugar in hybrid grains is intermediate between that of ordinary and of glutinous rice grains. Hybrid grains were thus shown to be chemically different from ordinary ones, though apparently quite similar to them. Author concludes therefore that in this case dominance is imperfect. —*S. Ikeno.*

HORTICULTURE

W. H. Chandler, *Editor*

[Unsigned abstracts are by the editor.]

507. Albro, F. W. **Chemical constants of avocado oil.** Ann. Rep. California Avocado Assoc. 1917: 92–93. April 30, 1918.—Considerable difficulty is experienced in extracting

avocado oil from the fresh pulp. Some was extracted however with petrolic ether, the solutio filtered through charcoal, and after further treatment with CO_2, an oil was obtained of a ligh golden color, with a bland and pleasant flavor. The chemical constants of the oil are give in tabular form in comparison with olive oil, butter fat, and cottonseed oil.—*I. J. Condit.*

508. ADAMS, CHAS. D. **Notes on avocado varieties for commerical orchards.** Ann Rept. California Avocado Assoc. **1917**: 31–34. April 30, 1908.—Popular.

509. ANONYMOUS. **Effect of June drop is still problematical.** The California Citrograp **3**[10]: 237. Aug., 1918.—Summary of the situation by editor.

510. ANONYMOUS. H. J., **Timely hints for avocado growers.** Florida Grower **17**[10]: 26 March, 1918.

511. ANONYMOUS. **Avocado varieties recommended for planting in California.** Ann. Rept California Avocado Assoc. **1917**: 101–103. April 30, 1918.—Recommendations by the Committee on Classification and Registration of Varieties.

512. BEACH, JOHN B. **The avocado in Florida.** Florida Grower **17**: 7. Feb. 2, 1918.—Popular.

513. CHACE, E. M. **Citrus byproducts.** Florida Grower. **17**: 9. Feb. 23, 1918.—Italian hand process for making essential oil of lemon is briefly described. This oil has not been successfully produced in United States of America on account of high labor cost and lack of a suitable mechanical method of production. Citrate of lime is made in same general way both in Sicily and United States of America. Process of producing citric acid from citrate of lime is described with brief discussion of the relative merits of wood, lead, enamelled ware and monel metal containers. Lemons and limes are the only citrus fruits containing sufficient citric acid to make recovery of the acid profitable. A very good grade of vinegar can be made from orange juice, about 1½ barrels being obtained from a ton of fruit.—*C. P. Wilson.*

514. CLARKE, SAM W. **Why I prefer the Kadota fig.** Fig and Olive Jour. **3**[1]: 11. *fig. 1.* June, 1918.—Popular.

515. COLLINS, C. F. **The fig and its culture.** California Cultivator. **50**: 324. March 16, 1918.—General.

516. CONDIT, I. J. **The avocado in Central and Northern California.** Ann. Rept California Avocado Assoc. **1917**: 35–38. April 30, 1918.—Popular.

517. CULBERTSON, J. D. **Renewing old lemon trees.** California Citrograph **3**: 202–203. *6 figs.* July, 1918.—An experiment in rejuvenating lemon trees twenty-five years old whose fruit production had become impaired. Shows effects of pruning at different seasons of the year. Discusses effects of various conditions on the subsequent behavior of the tree. Quality of the fruit was improved, but total quantity harvested was decreased by the pruning.—*H. S. Reed.*

518. DEWEY, MRS. M. H. **June drop.** *California Cultivator* **50**: *198. Feb. 16, 1918.*—Popular.

519. DEZELL, E. G. **Why the citrus industry needs a protective tariff.** California Citrograph **3**: 226–227. Aug., 1918.—The author, representing the Citrus Protective League of California, presented to the U. S. Tariff Commission through its representative, William S. Culvertson, a résumé of conditions confronting the grower and shipper of citrus fruits,

especially the need for a protective tariff for the lemon industry. This is the situation according to Mr. Dezell: There is a possibility of a "dumpage" of Italian lemons after the war since her European markets are demoralized. The Italian lemons will not be needed to supply the demand of this country. Seventy-five per cent of the lemon acreage of California has been non-bearing but is rapidly coming to production which will more than supply the demand of Canada and United States. Increased advertising setting forth the uses of lemons is anticipating this situation. Moreover, the larger production and distribution costs due to the war make competition with foreign markets difficult. Even before the war the cost of delivering a box of California lemons in New York was $2.73 as against $1.17 for the Italian lemons. Mr. Dezell gave several tables comparing transportation rates, increased labor and material costs, and home and foreign production so that the Tariff Commission would know the status of the industry to guide it in determining future tariff rates. The condition of the orange industry was also given but the danger from foreign "dumpage" is not so imminent.—*L. W. Bartlett.*

520. Elliott, J. M. **Utility and sentiment applied to the avocado.** Ann. Rept. California Avocado Assoc. **1917**: 83–84. April 30, 1918.—Popular.

521. Englehart, J. P. **Pruning lemon trees according to types of wood.** California Citrograph **3**: 229. Aug., 1918.—Popular.

522. Fesler, Martin. **My experience in growing the avocado.** Ann. Rept. California Avocado Assoc. **1917**: 29–30. April 30, 1918.

523. Fleet, W. H. **Pruning lemon trees.** California Citrograph **3**: 146–149. *15 figs.* May, 1918.—Description of a method of pruning lemon trees by which new shoots are frequently cut back to induce branching. Practical directions are given.—*H. S. Reed.*

524. Grossenbacher, J. G. **Fertilization of citrus groves.** Florida Grower **17**^{16}: 10. *1 fig.* April 20, 1918.—The subject is discussed under three headings: (1) the time and number of applications to make per year; (2) the amount and manner of applications, and (3) the percentage, composition and source of the necessary elements, if mixed goods are used, and the substances to apply when the simple materials are given. The writer presents his views on these topics as gained from experience and observations.—*I. J. Condit.*

525. Heiny, Francis. **Fig culture in the Imperial Valley.** Fig and Olive Jour. **3**^{2}: 11. July, 1918.—Popular.

526. Hirtzler, Victor. **The avocado for the table.** Ann. Rept. California Avocado Assoc. **1917**: 51–54. April 30, 1918.—A popular article with recipes and directions for the use of the avocado.

527. Hodgson, R. W. **This winter's cover crops especially important.** California Cultivator **51**: 203. Aug. 31, 1918.—Author calls attention to the ruling of the State Food Administrations against the use for fertilizer of materials suitable for stock feed, and also to the scarcity of manure and the high cost of commercial fertilizers. He states, therefore, that the citrus grower is now virtually under the necessity of raising a green manure crop and gives details of planting and handling winter cover crops.—*Gordon Surr.*

528. Hodgson, R. W. **Some pointers on June drop.** California Cultivator **50**: 689. *fig. 1.* June 8, 1918.—Popular.

529. Hodgson, R. W. **The Washington navel drop in 1918.** California Cultivator **51**: 99. *1 fig.* Aug. 3, 1918.—Popular.

530. HODGSON, R. W. **More June drop discussion.** California Cultivator **50**: 260. Mar. 2, 1918.—Popular.

531. HODGSON, R. W. **What is a rational system for pruning the Valencia?** California Cultivator **51**: 178. *1 fig.* Aug. 24, 1918.—Popular.

532. HODGSON, R. W. **Citrus blast.** Quart. Bull. State Hort. Bd. Florida **2**: 123–130. *2 Pl. 1 fig.* Jan., 1918.—Information contained in previous articles.

533. JAFFA, M. E., AND F. W. ALBRO.—**Studies on the composition and nutritive value of some sub-tropical fruits.** Ann. Rept. California Avocado Assoc. **1917**: 85–91. April 30, 1918.—Tables are given indicating the chemical and physical analyses of the avocado, guava, sapote, and Feijoa, the main part however referring to the avocado. A tabular statement shows that large avocados contain a smaller percentage of oil than small avocados. Experiments conducted at the Nutrition Laboratory have shown that the digestibility of avocado oil is equal to that of other oils. A comparison is made between avocado fat and butter fat. The effect of matürity upon the flavor and quality of the avocado is considered and it is recommended that the fruit be picked when the flavor is at its best.—*I. J. Condit.*

534. JENSEN, C. A. **June drop and its relation to the weather.** California Citrograph **3**: 255. *5 fig.* Sept., 1918.—An introductory statement is made that no clear-cut case has been made out by students of the "June drop" of the navel orange, for any of the following assigned causes nor for any combination of them, namely, lack of soil moisture at the critical period, low humidity, a certain fungus. Charts are given to show that the climatic conditions of June 1918 were about as good as could be expected in the interior citrus areas and much more favorable than in June 1917. Yet many observers considered the "drop" to be greater in 1918 than in 1917. The importance of taking into account the extremes of local climate rather than the average is emphasized.—*I. J. Condit.*

535. JENSEN, C. A. **Effect of different kinds of organic substances on, and relation of humus to orange yields.** California Citrograph **3**: 152. May, 1918.—Details of four experiments, carried out under field conditions in southern California, in which orange trees were basined and mulched with various organic materials. Different substances showed marked differences both on trees and crops, and the yields did not correlate with the amount of humus in the soils. Alfalfa hay and bean straw gave the highest yields while pine shavings decreased the crop. Three of the experiments were started in 1915 and the fourth in 1916.—*Gordon Surr.*

536. JONES, PAUL R. **Rejuvenation of lemon grove by three years' spraying.** California Citrograph **3**: 259. *2 fig.* Sept., 1918.—Popular.

537. KELLEY, W. P. **A new sugar in the avocado.** Ann. Rept. California Avocado Assoc. **1917**: 92. April 30, 1918.—The author gives a brief summary of the investigation made by Dr. F. B. La Forge in the Bureau of Chemistry at Washington of a new sugar hitherto not known to exist in any of the natural fruits. It differs from all previously known natural sugars in containing seven carbon atoms and is peculiar in the fact that it is apparently unfermentable. The name, D-Mannoketoheptose has been given it. The amount of sugar in the avocado varies from 0.5 to 1 per cent.—*I. J. Condit.*

538. LEWIS, E. S. **Pruning lemon trees six to twenty years old.** California Citrograph **3**: 230. *2 fig.* Aug., 1918.—Popular.

539. MARKARIAN, HENRY. **Caprification of the Smyrna fig.** Fig and Olive Jour. **3**[1]: 9. June, 1918.—Popular.

540. MILLS, J. W. **The Mission fig.** California Cultivator 50: 39. Jan. 12, 1918.—Popular.

541. MORROW, J. E. **The use of chayotes and their culture.** Florida Grower 17: 5. June 1, 1918.—Popular.

542. NEEDHAM, C. E. **How do the citrus growers view the avocado?** California Citrograph 3: 215. July, 1918.—Popular.

543. NEWBY, E. **The purpose of the California Fig Growers' Assoc.** Fig and Olive Jour. 3[8]: 13. Aug., 1918.—Popular.

544. POPENOE, WILSON. **Avocados as food in Guatemala.** Jour. Heredity 9: 99–107. March, 1918. [Illust.]—The avocado is a very common food in parts of the Guatemalan highlands where the fruits may be obtained during eight months of the year. Only the best fruits are of marketable value and they are sold for about half a cent each. The avocado replaces meat in the dietary of the natives and together with tortillas furnishes a sustaining food for the *cargadores* and other hard workers. References are made to the results of investigations of the California Station and of the Bureau of Chemistry on the food value of the fruit. Comparisons are made between the olive and the avocado as sources of oil.—*I. J. Condit.*

545. POPENOE, WILSON. **Exploring Guatemala for desirable new avocados.** Ann. Rept. California Avocado Assoc. **1917**: 104–138. *Pl. III–VIII, fig. 4–34.* April 30, 1918.—An account of the author's trip to Guatemala where he was sent by the Department of Agriculture at the request of the California Avocado Association. Budwood of thirty-six varieties was secured and forwarded to Washington, D. C., and to Miami, Florida, for propagation. The best results in shipping were secured during May, June, and July, the budsticks being simply placed in moist sphagnum moss and wrapped in heavy oiled paper.—All three types of the avocado are found in Guatemala, the West Indian, the Mexican, and the Guatemalan, the last being by far the most important. The West Indian type is common on the coast and is found up to an elevation of 2500 feet where it disappears. The Guatemalan type commences at 3000 feet and is most abundant from 4000 to 6000 feet and disappears entirely between 8500 and 9000 feet. Only two trees of the Mexican type were found.—The climatic zones in Guatemala and the characteristics of each are described and the fruits found commonly in each are listed. The avocado appears to be best in regions where the rainfall is not over 75 inches. In order to obtain hardy varieties the region at the upper limit of cultivation was visited and one variety, the Pankay, was discovered which had not been injured in the slightest by cold although most were killed back or severely injured.—The most important avocado regions are, in the order of their importance, Antigua, San Cristobal Verapaz, Purula, Amatitlan, the valley of Panajachel, and Momostenango. The largest trees were on clay soils yet good sized trees grew upon the volcanic loam of Antigua. The trees seem to have a habit of bearing a heavy crop one year and a light crop or no crop at all the following year. The variation in season of the fruit in Guatemala is due to two causes, first, altitude as expressed in its effect upon temperature, and second, the normal differences exhibited by seedlings. The Guatemalans consider the avocado mature and ready for picking when the tree comes into bloom although the flavor and quality is improved by allowing it to remain on the tree several months longer. Fully half of the seedling fruits found were green in color when mature; the appearance of purple color on certain varieties indicates maturity.—The native home of the Guatemalan type of avocado has not been definitely determined according to the author but he is inclined to believe that it may be in extreme northern Guatemala or across the Mexican frontier in the states of Chiapas and Tabasco.—Detailed notes are given on form, size, character and thickness of skin, color, quality, flavor, and seed of the avocados of Guatemala. A list of twenty-three varieties introduced for trial is given with a description of each and outline drawings of twenty. The article is well illustrated.—*I. J. Condit.*

546. Popenoe, Wilson. **How about the cherimoya?** California Citrograph **3**: 102. *1 fig.* March, 1918.—Impressions of the cherimoya are given, as gained by the writer during his trip to Guatemala. The previous statements in literature regarding 16-pound cherimoya were disproved as the largest found weighed just 5 pounds.—As an index to the hardiness of the tree the upper limit of cultivation was found to be only 500 feet below that of the Guatemalan race of avocados. It thrives between elevations of 3000 to 8000 feet where seedlings spring up along the roadsides by the hundreds, but it does not succeed at all in the hot, humid lowlands. The question of pollination of the flowers is considered and the writer ventures the assertion that Southern California is the one place in the United States where the cherimoya can be successfully produced on account of climatic conditions which favor pollination and the proper development of the fruit.—Much variation was observed in the fruitfulness of the seedling trees in Guatemala. Severe pruning to rid the trees of mistletoe seemed to favor fruit production as young wood produces a great abundance of flowers. Some unpruned trees, however, were equally as productive. Budwood of the productive trees in Antigua were sent to the United States for trial.—*I. J. Condit.*

547. Rixford, G. P. ***Influence on the fig industry of the Maslin seedling fig orchard* at Loomis.** Fig and Olive Jour. **3**[3]: 14. Aug., 1918.—The Maslin seedling fig orchard at Loomis, California, was planted in 1886 by E. W. Maslin. The orchard containing seventy-two capri fig trees was leased by the U. S. Department of Agriculture in 1910 and since that time large quantities of capri figs and cuttings have been distributed throughout the fig regions of California and others states. New varieties of figs have been developed by crossing and several of these are briefly described.—*I. J. Condit.*

548. Robertson, R. T. **Tangelos: What they are; the value in Florida of the Sampson and the Thornton varieties.** Florida Grower **18**: 5. Sept. 21, 1918.—The tangelos are the result of crosses between the tangerine and the grapefruit but the fruits resemble round oranges more than either parent. This article deals with two varieties, the Sampson and the Thornton which have been grown in a small way, chiefly for home use, although commercial plantings are being made at several places in Florida. The characteristics of each are given and the possibilities of similar hybrids discussed especially in regard to resistance to citrus canker.—*I. J. Condit.*

549. Roeding, G. C. **Caprification and varieties of capri figs.** California Cultivator **51**: 27. *3 fig.* July 13, 1918.—The early history of the Smyrna fig in California, the Maslin seedling fig orchard, and the early attempts to introduce the fig wasp (*Blastophaga grossorum*) are discussed. Facts are presented to refute the contentions of G. P. Rixford and W. T. Swingle that the Blastophaga had become established accidentally many years previous to 1899. Notes are given on the life history and habits of the Blastophaga. A few varieties of capri figs which the writer has found satisfactory are listed.—*I. J. Condit.*

550. Scott, L. B. **Avocado varieties in Florida.** Florida Grower **18**: 4–5. *1 fig.* Aug. 17, 1918.—Popular.

551. Scott, L. B. **Strains of Satsuma oranges in the United States.** Florida Grower **17**[14]: 7. April 6, 1918.—Variations in Satsuma oranges as observed in the United States by the writer and in Japan by Dr. T. Tanaka are discussed. Six so-called strains are described by Dr. Tanaka in a previous publication, while three strains were classified in this country by the writer and are described in this article. The importance of segregating each of these strains on account of differences in season of maturity, is emphasized.—*I. J. Condit.*

552. Scott, L. B. **Strains of Satsuma oranges in United States.** California Citrograph **3**: 254. *2 fig.* Sept., 1918.—Information noted from another source. [See Bot. Absts. 1, Entry 550.]

553. SCOTT, L. B. **Comparative merits of the California avocado varieties.** Ann. Rept. *California Avocado Assoc.* **1917**: 57–62. April 30, 1918.—The writer emphasizes the importance of reducing the number of avocado varieties to five or six standard ones which will assure a supply of good commercial fruit throughout the year. The following list includes those which seem to approach the requirements of an ideal avocado: Sharpless, Fuerte, Surprise, Spinks and Taft. Notes are given of each variety as well as several others considered of commercial importance. Variation within the variety is discussed.—*I. J. Condit.*

554. SHAMEL, A. D. **Some effects of shading lemon trees.** Month. Bull. California State Comm. Hort. **7**: 441–451. *4 fig., 8 tables.* July, 1918.—Seventy-six lemon trees were enclosed in tent of tobacco cloth in a grove at Corona, California. Records of wind velocity, air temperature, air humidity, soil moisture and fruit yields were kept, both within and without the tent. The average wind velocity and humidity were lower inside the tent. The average temperature of the air was slightly higher inside the tent than outside, but the relative humidity was slightly lower inside the tent. The moisture content of the first 3 feet of soil inside the tent was higher than that of the comparative soil area outside. In the second 3-foot layer the soil moisture was practically the same within and without the tent.—The trees under the tent seemed to bring a larger proportion of their fruit to maturity in the winter and fall months. The difference in total production was only slightly greater under the tent, but the trees produced a higher proportion of green fruits.—*H. S. Reed.*

555. SHAMEL, A. D. **Why navel oranges are seedless.** California Citrograph **3**: 204. July, 1918.—Popular.

556. SHARPLESS, B. H. **History of the Sharpless and the Monroe avocados, and my observations and experiences in propagating the same.** Ann. Rept. California Avocado Assoc. **1917**: 26–28. April 30, 1918.—A short account of the history, bearing qualities, and the writer's success in propagating the two varieties is given.—*I. J. Condit.*

557. SHEDDEN, THOMAS H. **Practical ideas for popularizing the avocado.** California Citrograph **3**: 54. Jan., 1918.—Popular.

558. SHEDDEN, THOMAS H. **How shall we eliminate the misnomer "Alligator Pear?"** Ann. Rept. California Avocado Assoc. **1917**: 41–43. April 30, 1918.—Popular.

559. SPINKS, W. A. **Interplanting and changing varieties.** Ann. Rept. California Avocado Assoc. **1917**: 44–48. 1918.—The writer suggests a plan for planting two or four varieties of avocados in the same orchard in such a way that the poorer varieties can be removed at any time, leaving one for the permanent planting. Four methods of top-working are discussed, namely—grafting into stubs in February; budding into the base of sprouts forced out for the purpose; budding directly into the bark of the trunk or main branches; budding into the old bark of stubs just as the new shoots start.—*I. J. Condit.*

560. STEWART, MRS. MARGARET. **My experience in growing avocados.** Ann. Rept. California Assoc. **1917**: 63–66. April 30, 1918.—Popular.

561. TAFT, C. P. **The Taft avocado and its history.** Ann. Rept. California Avocado Assoc. **1917**: 55–56. April 30, 1918.—A short account of the history and characteristics of the variety.—*I. J. Condit.*

562. TRIBBLE, CLAUDE. **Caprifying the Smyrna fig.** California Cultivator **51**: 7. July 8, 1918.—Popular.

563. TRIBBLE, C. D. **The pistache in California.** California Cultivator **50**: 68. *1 fig.* Jan. 19, 1918.—*Pistacia vera* is said to be a dry-land tree and should prove well adapted to

the foothills of California. *P. chinensis* which has been used for a stock is slow growing an dwarfs the more rapidly growing *P. vera* grafted on it. Directions for growing the seedlings budding and grafting the stocks, and planting the trees are given. The best varieties ar the Trabonella and Red Aleppo.—*I. J. Condit.*

564. Vosburg, E. D. **Avocado varieties in Florida.** Ann. Rept. California Avocad Assoc. **1917**: 24–26. April 30, 1918.—The question of varieties is an important problem i Florida, as in California. Of the 500 acres of budded groves in Florida, upward of 90 pe cent consist of the Trapp variety. The first trees of the Guatemalan type bore in Florid in 1912 and budwood of many varieties has been introduced. The Fuerte, Taft, Taylor Murrieta, and Beardslee are reported as having fruited. In Florida the Guatemalan varietie mature from one to three months earlier than the same varieties in California. Trees of th Mexican type have withstood temperatures of 20° and are therefore attracting some in terest.—*I. J. Condit.*

565. Wagner, C. F. **The Wagner, Lambert, and Surprise avocados.** Ann. Rept. Cali fornia Avocado Assoc. **1917**: 28–29. April 30, 1918.—Short account of the origin and fruit fulness of the three varieties.—*I. J. Condit.*

566. Webber, H. J. **Cold resistance of the avocado.** Ann. Rept. California Avocad Assoc. **1917**: 49–51. 1918.—This article sums up the information received by the writer fror fifty replies to a questionnaire sent to members of the Association. The following factor influencing injury are briefly discussed: age of tree; condition of growth; constitutiona condition; and time when irrigated. Notes are given on the comparative hardness of va rieties.—The following table of temperature endurance was prepared from the data collected

30°F.—Nothing injured as far as could be observed.

29°F.—No injury of account; only traces on most tender growth of West Indian and Guatemalan varieties.

28°F.—New foliage scorched on Guatemalan types; West Indian varieties showing con siderable foliage damage.

27°F.—Mexican varieties, with new tips slightly scorched; Guatemalan, with almost al new foliage injured; West Indian badly damaged.

25°F. to 26°F.—Mexican varieties, with new foliage injured but some dormant tree uninjured; all Guatemalan sorts, with new foliage badly injured, and some ol foliage scorched.

24°F.—Some dormant Mexicans uninjured; Guatemalan varieties badly injured, smal limbs frozen back.

21°F.—All Guatemalan types killed to bud; a few of hardest Mexicans, such as Knowles and San Sebastian, with young leaves only, injured.—*I. J. Condit.*

567. Webber, H. J. **Work and aim of the citrus experiment station.** California Citro graph **3**: 134. May, 1918.—The new Citrus Experiment Station and Graduate School of Tropical Agriculture at Riverside was dedicated March 27, 1918. Dr. H. J. Webber, Dear and Director of the station set forth its function as two-fold, investigation and instruction and illustrated its work by an account of the experiments conducted by the old citrus experi ment station in Riverside to determine the value of various elements in soils, the best kind of fertilizer, the worth of cover crops, and the suitability of various root stocks. Some of the results of these experiments show that nitrogen is by far the most important of the ordinary elements used in citrus fertilization, that plots fertilized with stable manure are more thrifty and show less mottle leaf than plots treated with chemical fertilizer, and that cover crops increase greatly the fertility of the soil. To conduct these experiments and others in process the Experiment Station has built up a strong faculty of specialists in specia divisions as chemistry, plant physiology, plant pathology, entomology, soil physics, plant breeding, and orchard management. Efficiency and seriousness of purpose characterize the spirit of the institution.—*L. W. Bartlett.*

568. WHITNEY, D. J. **Orange details: the matter of the June drop.** California Cultivator 50: 256. Sept. 14, 1918.—Popular.

569. WHITTEN, R. H. **Development of California's fig industry.** *Pacific Rural Press* 96[10]: 254. *1 fig.* Sept. 7, 1918.—Popular.

570. YOKUM, F. W. **Soil selection for fig growing and its treatment.** Fig and Olive Jour. 2[11]: 6. April and May, 1918.—Popular.

571. YOKUM, MRS. F. W. ***Proper curing of the fig essential to the success of the industry.*** Fig and Olive Jour. 3[2]: 9. July, 1918.—Popular.

572. ZOLLER, HARPER F. **Some constituents of the American Grapefruit. (Citrus decumana).** Jour. Ind. Eng. Chem. 10: 364. May 1, 1918.—A condensed historical sketch indicates introduction to U. S. A. via Mexico. The common claims as to medicinal value of G. are shown to be without proven foundation. Author is investigating the bitter principle identified as Naringin to demonstrate therapeutic value. Analysis of peel showed recoverable amounts of essential oil similar to orange oil, the glucoside Naringin ($C_{21}H_{26}O_{11}.4H_2O$) and pectin. Naringin is levorotatory (mol. rot. in $C_2H_5OH = -65.2$, 18°C.) cream colored monoclinic crystals, hydrolyzes to form mixture of rhammose and glucose. Naringin is considered of importance in differentiations of *C. decumana* from other citrus species. Grapefruit culls are regarded as a satisfactory source of commercial pectin, citric acid and possibly industrial alcohol. Naringin and pectin content increase during storage. Reducing sugars and sucrose increase.—*C. P. Wilson.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

[Unsigned abstracts are by the editor.]

573. MURPHY, PAUL A. **The morphology and cytology of the sexual organs of Phytophthora erythroseptica Pethyb.** Ann. Bot. 32: 115–153. *2 pl.* 1918.—A morphological and cytological study of the peculiar type of sexual reproduction which had been described by Pethybridge as based upon his observations on living or fresh material. Author describes in detail his cultural and staining technique. The antheridia and oogonia arise from different hyphae but the fungus is homothallic. The antheridium is first formed and is then pierced by the developing oogone which is, however, fully formed only after passage through the antheridium. There is a conspicuous degeneration of the nuclei present in both sexual structures before any nuclear division takes place. The remaining nuclei increase in size and become aggregated into a hollow sphere with a single nucleus lying in the center. The nuclei of this sphere now divide and it was possible to note all stages up to telophase when the degeneration of these nuclei takes place. The chromosome number was found to be four or six. At this time there appears a structure protruding from the oogonium into the antheridium. This corresponds in part to what has been called the receptive papilla by workers on related forms but for which the author suggests the term "manocyst." This persists for some time after the central nucleus has divided and after the migration of one of these sister nuclei to the periphery, when it disappears with the formation of the fertilization tube which here is a part of the oogonium. Only a single nucleus enters the oogone and comes to lie close to the female nucleus, but fusion of the male and female nuclei does not take place until after the formation of the three layers of the oospore wall. The cytology of the oospore following the sexual fusion was not studied. The entire study indicates a very close relationship of Phytophthora to Pythium, Sclerospora and Plasmopara. [See Bot. Absts. 1, Entry 1587.] —*E. M. Gilbert.*

574. Ericksson, Jacob. **Développment primaire du mildiou (Phytophthora infestans), au cours de la végétation de la pomme de terre. [Primary development of Phytophthora infestans and its course in the tissues of the potato.]** Rev. Gén. Bot. **29**: 257–260, 305–320, 333–349, 376–380; **30**: 16–30, 50–62. *6 pl., 5 fig.* 1918.—This series of papers is divided into four parts, the first of which is given over to a résumé of the earlier views of such men as Berkeley, Kuhn, de Bary, Wilson, Smith, and others as to the methods of hibernation of the fungus. *The second portion reviews the work of Clinton (1904–1910); Jones, Lutman, and* Giddings (1904–1910); Pethybridge and Murphy (1911–1913); and Melhus (1912–1915). The *author finds no satisfactory* explanation in any of these studies and states the problem as one of discovering the actual method of hibernation, which he feels has heen partly hinted at by Wilson and Smith; that is, there must be a plasmic latent phase found in the tuber itself. The remainder of the paper briefly gives the evidence based upon cytological studies and illustrated by microphotographs.

The author finds the first appearance of the disease indicated by characteristic spots on the mature leaves of the plant. These show a definite zonation; a dark central portion surrounded by a greyish velvety zone, outside of which is one of a pale green, rather distinctly set off from the normal green of the healthy leaf. Cytological studies of these areas show *distinct evidence of an existing mycoplasmic condition in the tissues, first distinctly noted* in the pale green layer where a number of small dark granules are found between the *chlorophyll bodies.* This is followed by a disintegration of the chlorophyll and the sudden appearance of several nucleoles. The granules and nucleoles now aggregate in various parts of the cell, giving the characteristic mycoplasmic condition described hy the author in earlier papers. Hyphae are soon organized in the intercellular spaces of the velvety zone and are noted to be of two types; one female, giving rise to oogones, the other male, and producing antheridia. Oospores are found in the central area, often in groups. Instead of resting, as is usually supposed, they immediately germinate, sending the conidiophore through the stomata and soon producing the conidia, each of which produces eight zoospores. The entire process is probably completed in less than twenty-four hours.—*E. M. Gilbert.*

575. Campbell, D. H. **Studies on some East Indian Hepaticae.** Ann. Bot. **32**: 319–338. *Pl. 8, 9. 10 fig.* 1918.—Two related genera of the Marchantiaceae, Dumortiera and Wiesnerella, are considered. In Dumortiera the air chambers, which are so conspicuous a feature in typical members of the family, are partially or wholly suppressed. The author regards this suppression as secondary and associated with the hygrophilous habit of the species. In Wiesnerella air chambers are present, but the genus shows evidence of reduction in the simple pores of the female receptacle. In the region studied Dumortiera is represented by the following three species: *D. trichocephala,* widely distributed in the Indo-Malayan region and Oceanica; *D. velutina* known only from Java and Sumatra; and *D. calcicola,* a Bornean species proposed as new. Wiesnerella, on the other hand, is monotypic, its only species, *W. denudata, being known from Java, the Himalayas, Japan and Hawaii.* In *D. calcicola* the fertile thallus is characterized by a jointed appearance, produced by successive apical innovations. Both male and female receptacles are borne on the same plant, and both are apparently sessile. The sessile condition of the female receptacle, however, may be associated with the absence of fertilization, no capsules being present. The vegetative organs and the general features of the sexual receptacles are taken up briefly in both genera, greater emphasis being laid on the sexual organs and the sporophytes. In Dumortiera the development of the antheridium is essentially the same as in the other Marchantiaceae. The mature antheridium is distinguished hy a conspicuous apical beak. The division of the spermatocytes is not diagonal as in Marchantia, and it is possible that it may be suppressed altogether. The development of the archegonium presents no distinctive features. The *embryogeny of Dumortiera is described in detail, apparently for the first time. At maturity* the seta elongates enough to enable the capsule to protrude completely. Dehiscence takes place by means of four somewhat irregular valves, which usually undergo secondary splittings. In its younger stages the sporophyte is comparahle with that of Plagiochasma; in its later stages it is closer to those of Preissia and Marchantia, although the foot is less

clearly defined. Under Wiesnerella the epidermal pores, air chambers, ventral scales and rhizoids are briefly described, and the many points of agreement between the sexual receptacles and those of Dumortiera are emphasized. The archegonia are essentially the same in both genera and the sporophytes, as far as could be determined from late stages of development, present no striking differences. The ripe spores of Wiesnerella, however, are larger than those of Dumortiera and show wing-like ridges instead of small papillae on the surface. [See Bot. Absts. 1, Entry 1046.]—*Alexander W. Evans.*

576. STEWART, F. C. **Tubers within tubers of Solanum tuberosum.** Brooklyn Bot. Gard. Memoirs 1: 423–426. *3 fig.* 1918.—Author records cases of the development of large new potato tubers within old ones which had been stored over summer. He shows that these new tubers are formed on ingrowing sprouts and notes that they are similar to those previously described by Gager, except for being considerably larger.

577. HARRIS, J. ARTHUR. **Further studies on the interrelationship of morphological and physiological characters in seedlings of Phaseolus.** Brooklyn Bot. Gard. Memoirs 1: 167–174. 1918.—A continuation of author's studies on relationship between morphological and physiological variations. Seedlings of Phaseolus which were somewhat abnormal structurally, in that they showed a slight vertical separation of the two cotyledons in their insertion on the axis, were grown each beside a normal seedling from the same seed plant, under similar environmental conditions. The primordial leaves and the first trifoliate leaf of the abnormal plants both produced a decidedly smaller weight of green leaf tissue and of dry substance than the corresponding leaves of normal plants. The percentage of dry weight produced in the leaves is also lower in the abnormal seedlings, but the difference between the two groups is much less marked than in the previous cases. Author concludes that plants with morphological abnormalities are also abnormal physiologically. [See Bot. Absts. 1, Entry 884.]

578. MACDANIELS, L. H. **The histology of the phloem in certain woody Angiosperms.** Amer. Jour. Bot. 5: 347–378. *Pl. 24–29.* 1918.—Records the results of a detailed comparative investigation of the structure of the phloem in 54 species of woody plants selected from 21 families of Dicotyledons. The author criticises the work of Hemenway and discusses the phylogenetic significance of the various types of vessels and sieve tubes with reference to the conservatism of seedlings and first annual rings. He states that there is no fundamental difference in type between sieve tubes in seedlings and in mature plants, but that in the former the sieve tubes are smaller and relatively less numerous than in the latter. The phloem of seedlings is very similar to that of one-year-old twigs. Companion cells are present in all families studied. There is little correlation between type of vessel and type of sieve tube. The sieve tubes of the lower woody Dicotyledons are fundamentally different from those of gymnosperms and vascular cryptogams. Widely different types of sieve tubes are found in species of the same family and even of the same genus, and there seems to be no gradual advance in sieve tube type which parallels our present ideas of phylogeny. The author concludes that in such a case as this, evidence from anatomy will be of phylogenetic significance only when gathered in great abundance and from a very wide range of forms.

579. SINNOTT, EDMUND W. **Conservatism and variability in the seedling of dicotyledons.** Amer. Jour. Bot. 5: 120–130. *4 fig.* 1918.—As a result of a study of seedling anatomy the author emphasizes the conclusion that a delimiting of certain stages in ontogeny as retentive or recapitulatory of ancestral features, in their entirety, cannot successfully be made. The study of more than 250 species belonging to 86 families has confirmed the observations of others as to the extensive variability of seedling structure in many respects. The structure of the cotyledonary node, however, is found to be remarkably uniform throughout large plant groups. The primitive type of leaf trace in ferns and seed plants has been shown to be a double one, or one consisting of an even number of strands. In dicotyledons, the author finds that although an odd number of veins is characteristic of all cotyledons (as

of foliage leaves), a feature evident externally in the strong midvein, it has arisen by a fusion of the two median bundles of the ancient type; and that the cotyledonary traces of all dicotyledons retain the ancestral condition, the median trace, single and central in the blade, being a double bundle in its origin. The relation between the vascular systems of the hypocotyl and the epicotyl, and the number of gaps caused by the departure of the cotyledonary trace were also found to be very constant, as was the type of venation of the cotyledon. "The seedling of dicotyledons is therefore variable in certain of its characters and conservative in others, thus emphasizing the importance of studying conservatism and variability in connection with particular characters rather than with particular organs or regions."—*A. J. Eames.*

580. SINNOTT, EDMUND W. **Factors determining character and distribution of food reserve in woody plants.** Bot. Gaz. **66**: 162–175. *2 fig.* 1918.—Gives the result of an extensive survey of the distribution of fat and starch in the stems (chiefly twigs and young branches) of woody plants at different seasons of the year. During the winter, starch was found to be most abundant in regions remote from centers of conduction and in cells with thick, well lignified, or small-pitted walls; fat, near the phloem, close to vessels, or in cells with thin or unlignified walls or large pits. The author suggests that the ease with which water or substances carried in water have access to the cell is probably a determining factor, and that "differences in the type of food reserve may be due to differences in water content of the various storage cells, resulting in modification of enzyme activity, or differences in the ease with which enzymes have effective access to the storage cells."—*I. W. Bailey.*

581. LANGDON, LADEMA M. **The ray system of Quercus alba.** Bot. Gaz. **65**: 313–323. *22 fig.* 1918.—The author gives a snyopsis of previous papers on the origin and interrelation of the various types of medullary ray in the wood of the Angiosperms, discusses these theories briefly and states the results of her study to obtain evidence bearing, not directly on the comparative morphology of ray types, but on the effect of growth conditions, position in tree, age of tree, etc. *Quercus alba* was studied intensively, material from various parts of three trees of different age and vigor being worked over. The conclusion is drawn that the ray system is not appreciably affected by the age or vigor of the tree or of the branch, or by location in the tree. Decreasing vigor of growth in mature wood, however, brings about progressively later and later appearance of multiseriate rays. This type of ray in seedlings and in the first annual ring was found to occur only in the region of departure of lateral leaf traces. The statements of previous writers that the influence of these traces is responsible for the form of the stele in oak stems,—five depressed segments alternating with five raised portions—are confirmed and elaborated. [See Bot. Absts. 1, Entry 1154]—*A. J. Eames.*

582. NOTHNAGEL, MILDRED. **Fecundation and formation of the primary endosperm nucleus in certain Liliaceae.** Bot. Gaz. **66**: 143–161. *Pl. 3–5.* 1918.—The chromatic phenomena attending fertilization and early endosperm formation in *Trillium grandiflorum* and *Lilium Martagon* have been investigated by the author. A brief history of double fertilization and triple fusion is given and attention is called to the fact that in no case have the chromatin changes in the first division following the contact of these fusing nuclei been carefully worked out for the Angiosperms. In *Trillium grandiflorum* the nuclear membranes separating the egg and sperm disappear and the nuclear content of the two is surrounded by a common membrane; the male and female chromatin do not fuse, and remain distinguishable up to the time of their arrangement on the equatorial plate. In both genera studied the chromatin of the three nuclei, which take part in the so-called triple fusion, remains distinct up to the formation of a typical bipolar spindle. One nucleus in the third division of the endosperm nuclei in *Trillium grandiflorum* showed three distinct groups of chromatic segments consisting of six chromosomes each.—*Margaret C. Ferguson.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

[Unsigned abstracts are by the editor.]

583. ARBER, A. N. **A note on submedullary casts of coal-measure calamities.** Geol. Mag. 5: 212–214. Dec. 6, 1918.—A short note pointing out the confusion originating from attempts to identify supposed pith casts of various *Calamites* which were in reality not true pith casts but incrustations of surfaces external to the pith, but not actually natural exterior surfaces. The name "sub-medullary" casts is suggested for them, and the conclusion drawn that they should be considered as specifically indeterminable.—*M. C. Stopes.*

584. BAILEY, I. W., AND W. W. TUPPER. **Size variation in tracheary cells: I. A comparison between the secondary Xylems of vascular cryptogams, gymnosperms and angiosperms.** Proc. Amer. Acad. Arts Sci. **54**: 149–204. 1918.—This is the first paper giving the results of a comparative study of the secondary xylem, more especially the tracheary elements, of vascular plants. The tabulated results are extensive and of great value to comparative anatomists, and the relationship between size of the elements and the stage of evolution of the different groups appears to be of definite phylogenetic value. It is shown that the tracheary elements in the so-called vascular cryptogams are very long, whereas among the gymnosperms belonging to the cordaitalen and cycadophyte alliances they approximate more or less those of the cryptogams, while the Gnetales on the other hand resemble the conditions found among the angiosperms. Among the latter, with the exception of the Trochodendraceae and Magnoliaceae, the elements are relatively very much shortened. In all dicotyledons and gymnosperms except Cordaitales and Cycadophyta the first formed tracheary cells of the secondary wood are relatively short and actually shorter than the adjoining elements of the primary wood or the subsequently formed elements of the secondary wood. This is in marked contrast to what prevails in the lower vascular plants which possessed relatively wide zones of primary wood. A second tendency toward reduction in length appears to have resulted from the evolution and differentiation of vessels. That the specialization concomitant with evolution resulted in shortening is indicated not only by the comparison between cryptogams and gymnosperms, but also by the similarity in this respect between angiosperms and the gnetalean gymnosperms and by the unusual length of the tracheids in the vesselless angiosperms Trochodendraceae, Drimys, etc. Certain correlations are also traced to other factors, as shown by the shorter elements in the slow growing and slender stemmed conifers (Taxaceae, Cupressaceae) and in the larger elements in the larger and more rapidly growing conifers. The effects of dwarfing and depauperation within a species shows in the shortening of the elements; and shortening is also recorded for regions where tissue adjustments are taking place as at the junction of root and stem, branches, wounds, compression wood, etc. There appears to be no absolute correlation between body size and cell size. [See Bot. Absts. 1, Entry 998.]

585. BERRY, EDWARD W. **Notes on the fern genus Clathropteris.** Bull. Torrey Bot. Club **45**: 279–285. *2 t. f.* 1918.—Describes an exceptional specimen of *Clathropteris platyphylla* (family Dipteriaceae) from the upper Triassic near Richmond, Virginia, and gives a restoration involving a new interpretation of the frond habit.

586. BERRY, EDWARD W. **A restoration of Neocalamites.** Amer. Jour. Sci. **45**: 445–448. *1 fig.* 1918.—Discusses the genus Neocalamites which represents descendents from the Paleozoic Calamites recently found to be not uncommon in the older Mesozoic rocks. A restoration is given and described of *Neocalamites knowltoni*, a striking form from the upper Triassic near Richmond, Virginia.

587. HICKLING, G. **A contribution to the micro-petrology of coal.** Trans. Inst. Mining Engineers **53**[3]: 137–158. *Pl. I–IV.* 1918.—The author points out that it is scarcely an

exaggeration to say that no rock in the Earth's crust is less understood than coal. Without going into previous literature, the author makes several observations on "dull" and "bright" layers of coal, discusses "streak" and "mother of coal" and other points. In conclusion, he classifies coal in three groups: (1) Humic, (2) Cannelloid, (3) Bogheads.

The value of the paper chiefly lies in its excellent colored illustration of coal sections, showing woody tissue, and its other good micro-photographs.—*M. C. Stopes.*

588. KNOX, G. **Some notes on the origin and composition of coal.** Proc. S. Wales Inst. Engineers **34**: 32–77. *Pl. VI.* 1918.—A semi-popular address, well illustrated, largely embodying the results of research work already published by many authors without references to the literature of the subject.—*M. C. Stopes.*

•589. KRYSHTOFOVICH, A. N. **On the Cretaceous Age of the "Miocene Flora" of Sakhalin.** Amer. Jour. Sci. **46**: 502–510. Sept., 1918.—A considerable fossil flora was described from the Island of Sakhalin in 1878 by Oswald Heer, who determined its age to be Miocene and it has been so considered since that time. The author explored the region in 1917 and demonstrates that Heer's materials were partly Cretaceous and partly Tertiary which were unintentionally mixed by the collectors of 1878. Kryshtofovich announces three series of beds below the true Tertiary—an Upper Cretaceous Orokkian series, a Middle Cretaceous Gyliakian series and a Lower Cretaceous Ainuian series—all plant bearing, especially the middle series which contains many forms common to the Atane beds of Greenland, the Raritan and Magothy formations of the Atlantic Coastal Plain and the Dakota sandstone of the western United States. The problem of the place of origin of the flowering plants is bound up in the study of Cretaceous floras. That they originated on one of the land masses of the Northern Hemisphere is now conceded, but the lack of any Asiatic records has heretofore been a most serious gap in the available records. The present paper is a preliminary abstract as much of the collected material was inaccessible in Petrograd at the time it was written in Tokyo. More exhaustive studies should yield results of the greatest importance.

590. KRYSHTOFOVICH, A. **On the Cretaceous flora of Russian Sakhalin.** Jour. Coll. Sci. Imp. Univ. Tokyo. **40**[8]. 73. *15 fig.* 1918.—A partial elaboration of the flora mentioned in the previous abstract from the Cretaceous of Sakhalin, formerly thought to be of Tertiary age. This flora is remarkable for its cosmopolitan character and contains many forms common to North America, Europe and the Arctic. New species are described in *MacClintockia, Celastrophyllum, Aralia, Stenopteris, Dicksonia* and *Gleichenia.*

591. SAHNI, B. **On the branching of the zygopteridean leaf, and its relation to the probable "pinna" nature of Gyropteris sinuosa Goeppert.** Ann. Bot. 32: 369–379. *3 fig.* 1918.—A detailed consideration of the course and significance of the pinna traces, particularly in relation to Bertrand's views. The suggestion is revived that *Gyropteris sinuosa* Goepp. is a secondary rachis of a form like *Metaclepsydropsis* or *Diplolabis.*—*M. C. Stopes.*

592. SCOTT, D. H. **Notes on Calamopitys, Unger.** Jour. Linn. Soc. London, Bot. **43**: 204–232. *1 fig. 2 pl.* 1918.—The author presents additional evidence of the course of the leaf trace and is mainly concerned with a re-examination and more complete description of the five known species of Calamopitys, a somewhat anomalous type coming from the upper Devonian and Lower Carboniferous of Europe and North America. The relationships are discussed and the known species are considered to represent a natural series and not yet capable of generic segregation. Their nearest affinity is held to be with the Lyginopteriaceae among the Pteridospermophyta through the genus Heterangium, and the two species *C. fascicularis* and *C. Beinertiana,* for which Zalessky proposed the new genus Eristophyton, are admitted to show structural advances in the direction of the Cordaitales.

593. SCOTT, D. H. **The structure of Mesoxylon multirame.** Ann. Bot. 32: 437–457. *2 fig., pl. 11–4.* 1918.—In continuation of former studies the author gives an account of the species *Mesoxylon multirame* from the English Coal Measures—the genus Mesoxylon being a type of

Cordaitales differing from the normal in the presence of centripetal xylem in the stem. In the present species this persists as long as the two strands of the leaf trace remain distinct. The only important difference from the previously described *M. poroxyloides* is in the course of the leaf traces—a specific distinction, and in the organization of the axillary steles—probably a functional adaptation. It differs from *M. Sutcliffii* and *M. Lomaxii* primarily in the structure of the inner zone of the wood and from the latter in the course of the bundles. Points of general interest are the presence of tangential pits on some of the tracheides and the occasional presence of xylem parenchyma; the probably resiniferous secretory sacs, sieve tubes and parenchyma arranged more or less concentrically to form the phloem; the lateral connections of the axillary stele and its frequent division in passing inward; the distichous branching of the axillary shoots; and the branches with scale leaves or bracts. Further studies of these most important Paleozoic types are promised.

594. STOPES, M. C. **New Bennettitean cones from the British Cretaceous.** Phil. Trans. Roy. Soc. London B208: 389–440. *Pl. 19–24. fig. 1–25.* 1918.—This is a detailed morphological and anatomical account of the fructification of a new species of Bennettites (*B. Albianus*); and also the first detailed account of *Bennettites maximus*, described many years ago from externals only by Carruthers. The new species is particularly interesting, because it is the first petrified remains of the group which has been found in the Gault of Great Britain, and also beause the cone is immensely larger than any hitherto described from any other horizon and contains innumerable small seeds. These are most beautifully petrified, and some of their details can be made out more perfectly than in any other species of *Bennettites* hitherto described.

The diagnosis given is as follows:

Fruit: Ovulate cone, not less than 70 mm. in diameter and probably much more.

Seeds: Innumerable, 600 or more in a single transverse section; five-ribbed, much elongated, torpedo-shaped, 5–6 mm. long, and about 1.2 mm. in greatest diameter. Seed with many-layered integument, enclosed in cupule-like extension of tubular cells of the stalk. Micropyles blocked by plug of nucellar tissue. Inter-seminal scales completely mutually fused round apex of seed and with seed tissues.

Embryo: With two cotyledons; radicle and hypocotyl relatively massive.

Scales: Externally covered by well-marked "plastid-layer" which runs round collar of micropyle.

Horizon: Gault (Albian).

This new species throws light on a variety of morphological points. *Bennettites maximus* shows various features of vegetative interest and also has extremely young cones, so young apparently that the male organs were not yet unfolded, and in the female cone were mere rudiments of the ovules. The species is re-diagnosed; and both are fully illustrated with text figures and photographic plates.—*M. C. Stopes.*

595. STOPES, M. C., AND WHEELER, R. V. **Monograph on the constitution of coal, based on a paper read before the London Section of the Society of Chemical Industry.** Pub. by H. M. S. Stationery Office for Dept. Sci. Industr. Research. 58: — — —. *Pl. 1–3.* 1918.—In small print and condensed form, this paper embodies the most complete chemical and palaeobotanical consideration of the composition of Bituminous Coal hitherto available. It is accompanied by a full bibliography, and endeavours to present in due proportion all the more important work hitherto done which bears on the actual constitution of coal—as distinct from its geological accumulation. The headings of the contents table are as follows: Definiton of Coal; General Constitution of Coal; Accumulation of Coal-forming Material; The Action of Solvents; Destructive Distillation; Distillation at Different Temperatures; Liquid Distillates; Microscopical Evidence on the Constitution of Coal, (1) Earlier work, (2) The present research; "Ulmic Substances;" The Action of Reagents; Artificial Coals; Theories; Appendix, on Classification; Bibliography.—*M. C. Stopes.*

596. Walkom, A. B. **The geology of the Lower Mesozoic rocks of Queensland, with special reference to their distribution and fossil flora, and their correlation with the Lower Mesozoic rocks of other parts of Australia.** Proc. Linn. Soc. N. S. Wales. 43: 37–115. *6 fig. 2 pl.* 1918. —The Lower Mesozoic rocks comprise the Ipswich, Bundamba and Walloon series, the first two being of limited extent and the last probably of much wider extent. The bulk of the coal produced in Queensland comes from the Ipswich with subordinate beds in the Walloon and sandstones of the latter yield artesian waters. The Lower Mesozoic is estimated to be from 15,000 to 17,500 feet in thickness and is considered to be almost entirely of continental origin. The fossils are exclusively plants in the Ipswich and Walloon and insects in the former—the Bundamba series being unfossiliferous. The Ipswich is definitely referred to the late Triassic and is considered as possibly of Rhaetic age, while the Walloon series is referred to the Jurassic and its flora is compared with Liassic and lower Oolitic floras of other regions. The Lower Mesozoic was a time of similar anomalous continental deposits in other parts of Australia, as well as in India and South Africa, and their respectve floras are of the greatest importance to students of the evolution and migrations of floras. The author discusses the geological history of the region which he illustrates by a series of paleogeographic maps covering the period between the close of the Paleozoic and the dawn of the Cretaceous.

597. Walkom, A. B. **Mesozoic floras of Queensland. Part II. The flora of the Maryborough (marine) Series.** Queensland Geol. Surv. Publ. 262. *21 p. 2 pl.* 1918.—The paper has a short introductory geological note by the Chief Government Geologist (Mr. B. Dunstan). Some 14 species are described, mostly from fragmentary specimens. They come from the Maryborough Marine Series which are generally regarded as of Lower Cretaceous Age, equivalent to the Rolling Downs Series of Western Queensland. There is no doubt that the plants occur in the marine beds as in some cases they are on the same specimen as marine shells.—*M. C. Stopes.*

PATHOLOGY

Donald Reddick, *Editor*

[Unsigned abstracts are by the editor.]

598. Anderson, Paul J. **Rose canker and its control.** Massachusetts Agric. Exp. Sta. Bull. 183: 11–46. *Pl. 1–3, 11 fig.* May, 1918.—A monographic treatment on the canker of roses caused by *Cylindrocladium scoparium* which has become serious on greenhouse roses in America. Experiments mostly on the life history of the fungus and control of the disease. —Another species of the same genus, *C. parvum* n. sp. is common on roses but a saprophyte. —Recommendations for control (1) selection of disease-free plants, (2) disinfection of pots, soil, benches, tools, etc., either by steam (over 50°C. for 10 minutes or more), hot water, or formaldehyde (at rate of 1 pint to 25 gallons and 2 gallons of the dilute solution per cubic foot of soil).—*P. J. A.*

599. Ballard, W. R. **Strawberry notes.** Maryland Agric. Exp. Sta. Bull. 211: 51–76. Jan., 1918.—The relation of yield to percentage of stand is graphically shown. The degree of resistance to mycosphaerella leaf-spot is noted for 55 varieties.—*J. B. S. Norton.*

600. Blake, M. A. **Some important points in fruit growing.** Rept. Maryland Agric. Soc. 2: 109–117. Mar., 1918.—Gives recommendations for control of peach diseases due to Exoascus, Cladosporium and Sclerotinia, and the results of dusting trees in New Jersey.—*J. B. S. Norton.*

601. Brandes, E. W. **Anthracnose of lettuce caused by Marsonina panattoniana.** Jour. Agric. Res. 13: 261–280. *4 fig. Pl. C, 20.* April 29, 1918.—The disease described is said to occur chiefly on greenhouse lettuce and its development is favored by the conditions under

which it is grown. A brief summary of previous investigations is followed by an account of the present known distribution of the fungus, which is found in Europe as well as the United States. The symptoms and etiology of the disease are described. Inoculation experiments show that infection occurs in cool weather rather than in hot weather. Relation of moisture and dissemination of the organism is discussed. The trash from a previously diseased crop is regarded as the chief agent in carrying the disease over from year to year. The disease is spread in greenhouses by splashing of water in watering of plants. Sanitary methods such as destruction of trash of a preceding crop, rotation in the field and avoidance of manure containing lettuce refuse are recommended to reduce disease. Splashing of water from plant to plant or leaf to leaf is also to be avoided. Good ventilation is desirable. Spraying with Bordeaux mixture is only recommended as a last resort. [See Bot. Absts. 1, Entry 391.]—*C. L. Shear.*

602. Brooks, Charles, and D. F. Fisher. **Irrigation experiments on apple-spot diseases.** Jour. Agric. Res. 13: 109–137. 1918.—The writers give the distinguishing characteristics of bitter pit, Jonathan spot, drouth spot, cork, blister and rosy aphis stigmonose. Detailed irrigation experiments are reported on bitter pit and Jonathan spot. Heavy irrigation greatly increased the amount of bitter pit. Medium irrigation followed by heavy late in the season resulted in more of the disease than continuous heavy irrigation. Heavy irrigation followed by light gave less bitter pit than light irrigation throughout the season. Large apples had more bitter pit than smaller ones but heavy irrigation increased the disease practically as much on small and medium sized apples as on large ones. Irrigation had but little influence on Jonathan spot. Observations are reported indicating that drouth-spot is due to sudden and extreme drouth and that cork, and blister are drouth effects confined to certain peculiar soil areas. [See Bot. Absts. 1, Entry 58.]—*Charles Brooks.*

603. Brown, Nellie A. **Some bacterial diseases of lettuce.** Jour. Agric. Res. 13: 367–388. *Pl. E, 29–41.* May 13, 1918.—Two bacterial diseases of lettuce are described as new in this paper; one found in South Carolina and Virginia, the other on greenhouse plants in Kansas. Isolation and inoculation experiments with both organisms are described in detail, also the relation of the organism to various media and temperature as well as moisture. The organism from South Carolina and Virginia lettuce is described as *Bacterium vitians* n. sp. The organism producing the disease on greenhouse lettuce from Kansas is described as *Bacterium marganale*, n. sp. This affects the margins of the inner whorl of leaves of immature plants chiefly. Subirrigation and good ventilation are the chief means recommended in preventing this disease.—*C. L. Shear.*

604. Bryan, C. E. **How many applications of spray material can be applied profitably in developing a peach crop?** Rept. Maryland Agric. Soc. 2: 92–102. Mar., 1918.—Spraying five times cost 30 cents per tree, and an increase of half a basket per tree paid the entire expense. —*J. B. S. Norton.*

605. Coons, G. H. **Seed tuber treatments for potatoes.** Phytopath. 8: 457–468. *6 fig.* 1918.—Field experiments to test the relative value of new and old methods of treating potato tubers for the control of scab (Actinomyces) and scurf (Rhizoctonia). There is no record that potatoes had been grown previously on the land. Untreated, scabby seed stock yielded low grade scabby (38 per cent) tubers; untreated seed stock free from scab yielded a good grade of tubers with 12 per cent scab. Scabby seed stock dipped in formaldehyde solution 1 : 240 for 15 minutes and 1.5 hours yielded a good grade of tubers with 0.7 and 1.1 per cent scab respectively, while seed stock free from scab and subjected to the same treatments yielded good tubers with 0.1 and 7.4 per cent scab, respectively. (The latter percentage is thought to be the result of an error.) Sprinkling seed stock with formaldehyde, 1 : 240, gave excellent control of scab and the method gives promise of practical application.—Bleaching powder, 5 per cent solution did not prove particularly effective in controlling scab.—Treatments for scurf with formaldehyde solution in the above-named dilutions and for the same

lengths of time and with mercuric chlorid, 1 : 1000, for 0.5 and 1.5 hours indicate that the latter material at either interval is more effective (the longer interval seems to have reduced the stand) but the percentage of scurf in the progeny from untreated scurfed seed stock is only 14.—Selection of seed stock free from sclerotia of Rhizoctonia yielded a progeny free from scurf.—Spraying scabby seed stock with concentrated formaldehyde, 15 cc. per bushel, gave control of scab but the "stand" was reduced, apparently by the treatment. Likewise treatment with hot (54° at start) mercuric chloride, 1: 1000 for 5 minutes, gave control of scab and scurf but there seems to have been a reduction in "stand" from the treatment.—The organisms causing these two diseases apparently are introduced largely if not entirely on seed stock.

606. CORY, E. N. **Control of insects and diseases of fruits and vegetables.** Maryland Agric. Extens. Service Bull. 11. Feb., 1918.—A spray calendar.—*J. B. S. Norton.*

607. DOIDGE, E. M. **Potato diseases: V. Bacterial wilt or Vroptootje. (Bacterium solanacearum Erw. Sm.)** S. Afric. Fruit Grower **4**: 236. June, 1918. [Also published as Bull. *Local Series No. 49, S. Afric. Dept. Agric.*]

608. DOIDGE, E. M. **Potato diseases: VI. The Rhizoconia disease of potatoes (Corticium vagum var. Solani Burt.).** S. Afric. Fruit Grower **5**: 6. July, 1918.

609. EDSON, H. A., AND M. SHAPOVALOV. **Potato stem lesions.** Jour. Agric. Res. **14**: 213–220. *Pl. 24–26.* July 29, 1918.—From isolation and inoculation experiments under greenhouse conditions several species of Fusarium as well as Alternaria, Botrytis, Sclerotinia, Zygorrhynchus, Corethropsis, Phoma, Clonostachys, and Acrostalagmus, are added to Rhizoctonia as causal organisms in the production of potato stem lesions, while several of the strains of Rhizoctonia tested were unable to attack the plants.—*H. A. Edson.*

610. ELLIOTT, CHARLOTTE. **Bacterial oat blight.** Phytopath. **8**: 489–490. 1918.—Disease prevalent in north central states during a period of driving rains and cool weather. The plants were yellowish but resumed their normal blue-green color with the advent of dry, warm weather. Two diseases were observed the "halo" blight and "stripe" blight, but the former was by far the more common. The typical lesion of halo blight, when young, is an oval chlorotic area about a minute center of sunken dead tissue. The stripe blight lesion appears water soaked, somewhat translucent and usually extends as a long, rather narrow, sharply delimited streak between the veins. Absence of a halo and presence of glistening white flakes of exudate are diagnostic of streak blight.—Both diseases are caused by white bacterial pathogenes.

611. ELLIOTT, JOHN A. **Storage rots of sweet potatoes.** Arkansas Agric. Exp. Sta. Bull. **144**: 1–12. *Pl. 1, fig. 1–10.* April, 1918.—Popular presentation describing principal storage diseases of the sweet potato with control measures, including construction and management of storage houses.—*J. A. E.*

612. ENLOWS, ELLA M. A. **A leafblight of Kalmia latifolia.** Jour. Agric. Res. **13**: 199–212. *2 fig., pl. 14–17.* April 15, 1918.—A leafblight disease of mountain laurel found in Washington and vicinity is described. Brown areas are formed on the leaves which finally involve the entire plant. The causal organism was isolated from diseased leaves and the disease reproduced by inoculation experiments. Inoculation experiments with citrus, egg-plant and apple gave negative results. The cultural characters of organisms in various media are given. The fungus is described as *Phomopsis kalmiae*, n. sp. [See Bot. Absts. 1, Entry 402.]—*C. L. Shear.*

613. FROMME, F. D. **An automatic spore trap.** Phytopath. **8**: 542–544. *Fig. 1.* Oct. 1918.—One-half of a petri dish is attached to the shaft of the hour hand of a clock. Non-

nutrient agar is used. A frame work of thin metal strips set on edge, in the manner of a paddle-wheel, is forced into the solidified agar in the dish and divides its area into 12 sections. A metal cover, which fits over the rim of the clock case, has an aperture which exposes a sector equivalent to one-twelfth of the area of the dish.

614. Gray, Geo. P. **Economic toxicology.** Science 48: 329–332. 1918.—Economic toxicology is that phase of toxicology that has to do with the relation of poisons to the control of pests detrimental to agriculture and to the public health.—History of the development of a chemical laboratory dealing exclusively with fungicides, insecticides, herbicides and "zooicides," their chemistry, manufacture and uses.—Description of a university course in the subject and an indication of the usefulness of treating the subject from the chemical standpoint.

615. Güssow, H. T. **Drouth injury to McIntosh apple.** Phytopath. 8: 490–491. *Fig. 1.* 1918.—Fruit from British Columbia showed sunken, brown, lesions more or less confluent and irregular in shape and outline accompanied by vascular necrosis.—Very slight precipitation in the orchard from January to June 1917 is thought to be responsible.

616. Güssow, H. T. **Observations on obscure potato troubles.** Phytopath. 8: 491–495. *5 fig.* 1918.—I. *Heterodera radicicola* on tomato roots in the greenhouse became established on potato tubers when a potato was planted in the same pot. Only female eelworms were observed. The wormy potatoes were planted and the progeny was free from attack.

II. *Unfavorable storage conditions.* In badly ventilated storage cellars potato tubers show numerous bluish-black warts about 5 mm. in diameter. The warts show plainly on peeling and consist of hard brown cells.

III. *Leaf streak.* Potato leaves show a network of dark brown lines following the leaf veins, with a similar color feebly diffusing into the surrounding tissues. Affected leaves turn yellow and die. At times lesions occur in the leaf stalk. Tubers show no lesions but those from affected plants reproduce the trouble when planted. Streaks are similar to those sometimes found on plants affected with mosaic but there is no connection between the two diseases.—No organism has been found.

IV. *Mosaic disease transferred by inarching.*—Mosaic of potato could not be transferred by contact but was transmitted by an inarched graft. The disease did not appear in the grafted plant but each of the four tubers produced by it developed typical mosaic.

617. Hesler, L. R. **Progress report on citrus scab.** Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 30–31. 1918.—Preliminary report on the cause and control of citrus scab. Studies support the contention that the disease is due to the fungus *Cladosporium citri.* Copper and various sulfur and lime fungicides were employed in experimental groves. The opinion is expressed that treatment with lime-sulfur solution, supplemented by occasional applications of Bordeaux mixture, is worthy of thorough trial.—*L. R. Hesler.*

618. Hodgson, Robert W. **A Sterigmatocystis smut of figs.** Phytopath. 8: 545–546. Oct., 1918.—Badly infected figs can be detected by the discoloration of the outer skin. Mild cases are noted only on opening the fig when one or more streaks of a black gummy nature are observed. Ordinarily 3 to 10 per cent of the figs at Fresno, California, are affected, occasionally as high as 15 to 25 per cent. From artificial cultures and inoculations of pomegranate it is concluded that *Sterigmatocystis castanea* is the cause of the trouble. Some figs become infected while on the tree but it is thought that many are infected after they fall to the ground.

619. Johnston, E. S. **Report on nut tree investigations in Maryland.** Maryland Agric. Exp. Sta. Bull. 218: 236–265. June, 1918. The death or survival of several hundred trees of *Juglans regia* and *Hicoria pecan* planted throughout Maryland in 1907–8 is tabulated, with notes on winter killing. Chestnut blight (*Endothia*) is reported in nearly all counties of the State.—*J. B. S. Norton.*

620. JOHNSTON, JOHN R. **Enfermedades y plagas del cacao en el Ecuador y metodos modernos apropiados al cultivo del cacao. [Cacao diseases in Equador and methods of cacao cultivation.]** [Review of: Rorer, J. B. Same title.] Phytopath. **8**: 550. 1918.

621. JONES, FRED REUEL. **Yellow leaf blotch of alfalfa caused by the fungus Pyrenopeziza medicaginis.** Jour. Agric. Res. **13**: 307–330. *6 fig. pl. D, 25–26.* May 6, 1918.—The yellow-leaf blotch of alfalfa has only been known in the United States for the past two years according to the author, but is quite widely distributed. It is also said to occur in Argentina and Europe. Notes on its economic importance are followed by a description of the disease. The causal organism, *Pyrenopeziza medicaginis*, the stages in its life history and the synonomy are discussed. The conidial condition is found to be *Sporonema phacidioides* Desm. Detailed descriptions of the morphology and physiology of the organism and of the production of apothecia in pure culture are given, also the behavior on various culture media. Inoculation experiments with both conidia and ascospores are described. It is concluded that infection appears to take place only from ascospores. The fungus over-winters on dead leaves. Cutting infested leaves before the perfect stage of the fungus is developed appears to hold the disease in check. Methods of sanitation are recommended as control measures. The removal of the dead leaves as a sanitary precaution is suggested.—*C. L. Shear.*

622. LEE, H. ATHERTON. **Early occurrence of citrus scab in Japan.** Phytopath. **8**: 551. 1918.—Lesions of citrus scab [Cladosporium?] found on *Citrus nobilis* collected in 1863 in Japan.

623. LONG, W. H. **An undescribed canker of poplars and willows caused by Cytospora chrysosperma.** Jour. Agric. Res. **13**: 331–345. *Pl. 27–28.* May 6, 1918.—A canker of Populus and Salix is described as occurring in several Western states. The lesions are said to resemble sun-scald as it occurs on trunks of fruit trees. Pure cultures of the fungi were isolated from cankers and typical lesions of the disease produced by inoculating healthy plants. A description of pure cultures of the organism in the different culture media is given. The fungus is said to enter the host through wounds and dead branches. On poplars the disease in the Southwest is serious on trees growing at the outer limit of their range, also on trees planted on the streets and lawns, where they are subject to neglect and lack of water, also on trees that have been severely pruned, and in propagating beds. As control measures the selection of resistant species and an abundant water supply, with protection from mechanical injuries is recommended, also a careful inspection of nursery stock to avoid the distribution of disease. —*C. L. Shear.*

624. MACMILLAN, H. G. **Sunscald of beans.** Jour. Agric. Res. **13**: 647–650. *Pl. 64–66.* June 17, 1918.—A spotting and streaking of bean pods and stems easily mistaken for bacterial blight is shown to be the result of sunscald. None of the varieties of beans observed was immune from the trouble which, though general in the district, is not destructive.—*H. A. Edson.*

625. MASSEY, LOUIS M. **The diseases of roses.** Trans. Massachusetts Hort. Soc. **1918**: 81–101. *Pl. 1–2.* 1918.—Four diseases,—black spot (*Diplocarpon rosae*), powdery mildew (*Sphaerotheca pannosa rosae*), crown canker (*Cylindrocladium scoparium*) and crown gall (*Bacterium tumefaciens*)—are discussed in detail in regard to history and distribution, economic importance, symptoms, etiology, environmental relations and control.—Recommends application of powdered sulfur and arsenate of lead for the first two and soil disinfection, careful selection and sanitation for the last two. Author's treatment of crown canker about the same as in Phytopath. **7**: 408–417; experiments described here for control of black spot and mildew the same as described in Phytopath. **8**: 20–23.—*P. J. Anderson.*

626. MATZ, JULIUS. **Some diseases of the fig.** Florida Agric. Exp. Sta. Bull. **149**: 3–10. *Fig. 1–5.* Aug., 1918.—Anthracnose (*Glomerella cingulata*); Leaf blight (*Rhizoctonia micro-*

sclerotia); Fig rust (*Physopella fici*); Root-knot; Sclerotium blight (*Sclerotium rolfsii*); Limb blight (*Corticum salmonicolor*); Dieback; Dropping of fruit.—C. D. SHERBAKOFF.

627. NEWCOMER, A. **Will dusting produce as satisfactory results as spraying in developing a peach crop?** Rept. Maryland Agric. Soc. 2: 102–109. Mar., 1918.—It will, with both peach and apple.—*J. B. S. Norton.*

628. NORTON, J. B. S., AND C. E. LEATHERS. **Conditions detrimental to seed production.** Maryland Agric. Exp. Sta. Bull 216: 175–226. June, 1918.—The effects of hereditary defects and various environmental factors upon seed production are discussed in a general way and then in detail for each important crop and many minor crops. Special attention is given to seed diseases and seed disinfection, pollination difficulties and immature seeds. A bibliography of 347 titles is included. The results of experiments and observations are reported on the effect of cold, fermentation and fruit rot on tomato seed germination; disinfection of cabbage seed by chemicals and hot water; germination of immature tomato and cowpea seeds; germination of solanaceous seeds in manure; tomato seed production; and effect of fertilizers on tomato blooming. [See Bot. Absts. 1, Entry 747.]—*J. B. S. Norton.*

629. NORTON, J. B. S. [In: BALLARD, W. R., *Strawberry notes.*] Maryland Agric. Exp. Sta. Bull. 211: 74–75. Jan., 1918.—Notes on Mycosphaerella leaf-spot, Sphaerotheca and Botrytis diseases of strawberry, general disease control, and varieties resistant and susceptible to the leaf-spot.—*J. B. S. N.*

630. OSNER, GEORGE A. **Stemphylium leaf spot of cucumbers.** Jour. Agric. Res. 13: 295–306, *3 fig., pl. 21–24.* April 29, 1918.—The author describes a leaf spot of cucumbers found doing more or less damage in the vicinity of Plymouth, Indiana, and Bowling Green, Ohio. The spots vary in size and outline. The center is light, yellowish brown, surrounded by a reddish brown border, sometimes nearly white. The causal organism was isolated from these spots and its relation to the disease demonstrated by successful inoculations. Four varieties of cucumbers, two of gourd and two of squash were successfully inoculated. The disease is regarded as hitherto unpublished and the causal organism is described as *Stemphylium cucurbitacearum* n. sp. It is shown that high temperatures and a dry atmosphere are unfavorable to the development of the fungus. The organism lives over winter on diseased plants. Spores are disseminated by wind, rain, insects, etc. Preliminary experiments give promise that the disease may be controlled by Bordeaux mixture. Sanitary measures such as destruction of vines and crop rotation are recommended. [See Bot. Absts. 1, Entry 433.]—*C. L. Shear.*

631. PIERCE, ROY G. **Additional list of state and national quarantines against the white pine blister rust.** Phytopath. 8: 484–486. 1918.—Supplements and corrects original list given in: Phytopath. 7: 319–321. 1917.

632. PRATT, O. A. **Soil fungi in relation to diseases of the Irish potato in southern Idaho.** Jour. Agric. Res. 13: 73–100. *4 fig., pl. A–B.* April 8, 1918.—Fungi, including five new species of Fusarium isolated from desert soils are reported in detail. *Fusarium radicicola, Fusarium trichothecioides* and *Rhizoctonia solani*, known to be parasitic on the Irish potato, were isolated from Idaho soils known never to have been cropped with potatoes. The results of planting disease-free seed potatoes on cultivated lands never in potatoes, and on virgin desert land substantiate the opinion that land, previously cropped with such crops as alfalfa, clover, and grain, is better adapted to the production of disease-free potatoes than virgin desert land. [See Bot. Absts. 1, Entry 436.]—*H. A. Edson.*

633. RATHBUN, ANNIE E. **The fungus flora of pine seed beds.** Phytopath. 8: 469–483. 1918.—Species of Mucor, Penicillium, Aspergillus, *Rhizopus nigricans, Zygorrhynchus vuillemini, Trichoderma koningi* and some others were found at various depths from 1 to 44 in.

"With the exception of Fusarium no fungus known to cause damping off has yet been isolated from the soil of the nursery." The parasitism of "Fusarium" is not shown.—"Grubs and earthworms are carriers of the spores of soil fungi."

634. Reddick, Donald, and Vern B. Stewart. **Varieties of beans susceptible to mosaic.** Phytopath. 8: 531–534. Oct., 1918.—The common snap and shell varieties of *Phaseolus vulgaris* have been tested. Practically all are susceptible. White marrow is immune or highly resistant. The common Navy Pea is most susceptible but a pea bean, variety Robust, is found to be immune. Evidence is presented indicating that field selection of disease-free plants is not effective in eliminating the disease.

635. Reynolds, Ernest Shaw. **Two tomato diseases.** Phytopath. 8: 535–542. *2 fig.* 1918.—(1) Leaf chlorosis. Definite white areas or spots appeared on certain leaves of variety Bonny Best. The disease did not spread to other plants and only rarely did new leaves on affected plants develop the trouble. It could not be transferred to other plants by rubbing, and external applications of iron salts did not lessen it.—Theoretical discussion contains remarks on "the so-called mosaic disease." (2) Blossom end rot. Symptoms are described in detail. Attempts to find a causal organism failed. "It would not be surprising to find that several different and independent causes acting upon a uniform tissue, produce results of generic similarity and hence give rise to a group of diseases all at present included under one name."—Discussion of conditions of infection.—Disease may be caused by an ultra-microscopic organism which infects at time of pollination.

636. Roberts, John W. and Leslie Pierce. **Apple bitter-rot and its control.** U. S. Dept. Agric., Farmers Bull. 938, 1918. *14 p., 3 fig.*—Gives a brief statement in regard to the occurrence, characteristics, and cause of bitter rot but is devoted largely to the questions of infection and control. The disease is reported to be carried through the winter in mummied apples, in bitter-rot cankers and in cankers in which the bitter-rot fungus is a secondary infection. In the Eastern States the disease seems to pass the winter largely in the mummies but in badly infected orchards of the Middle West, the cankers often surpass the mummies in importance. The spores are carried by rain drops, by insects and probably also by birds. In the average orchard in bitter-rot sections the disease can be controlled by three or four sprayings with Bordeaux mixture but in orchards where the disease has been very destructive for a number of years it is often necessary to remove the overwintering sources of infection in order to secure complete control. A list of apple varieties is given with reference to their relative susceptibility to bitter rot.—*Charles Brooks.*

637. Roberts, John W. **The sources of apple bitter rot infections.** U. S. Dept. Agric. Bull. 684: 1–26. *5 pl.* 1918.—A detailed report of orchard experiments is given and the following conclusions are drawn: Bitter rot is due to the fungus *Glomerella cingulata.* The mummies are the chief sources of infection; both those on the tree and those on the ground being important. The fungus appears to live over but one year in a mummy. In cankers on young, vigorous branches the fungus does not survive till the next season; in cankers on older twigs of susceptible varieties it may survive for several years. Different varieties of apples show different degrees of susceptibility to the cankers. The fruit of a variety may be susceptible to rot and the limbs practically immune to cankers. The fungus can be found in cankers aud dead wood due to various causes. It is able to infect many plants other than the apple.—*Charles Brooks.*

638. Rosenbaum, J., and G. B. Ramsey. **Influence of temperature and precipitation on the blackleg of potato.** Jour. Agric. Res. 13: 507–513. June 3, 1918.—From a study of climological data and soil temperature records in correlation with outbreaks of the blackleg disease of the potato, caused by *Bacillus phytophthorus*, the conclusion is drawn that high temperature and low precipitation tend to diminish the severity of the disease, while low temperature and high precipitation favor its development. No evidence could be obtained

that the organisms overwinter in a virulent condition either in soil or buried tubers in Maine or in Virginia.—*H. A. Edson.*

639. SHEAR, C. L. **An outline of the history of phytopathology.** [Review of: Whetzel, Herbert H. (Same title.) Philadelphia, 1918.—See Bot. Absts. 1, Entry 377.] Phytopath. 8: 487–488. 1918.

640. SIEGLER, E. H. **A brief analysis of the dusting method.** Rept. Maryland Agric. Soc. 2: 86–98. Mar., 1918.—The history of dusting, formula for arsenate of lead and sulfur dusts for fruit insects and diseases, methods of application and results are given. Peach scab (Cladosporium) was controlled, apple diseases not.—*J. B. S. Norton.*

641. STEVENS, F. L., W. A. RUTH AND C. S. SPOONER. **Pear blight wind borne.** Science 48: 449–450. 1918.—Branches of pear trees were enclosed in insect proof cages. No insects were found in the cages but the enclosed twigs blighted to the same extent as those not so treated. "The only tenable hypothesis is that wind was the chief agent of transmission." —Supporting evidence lies in the fact that insects were not abundant in the orchard and that no insects have been observed feeding on the exudate, of *Bacillus amylovorus*, from cankers.

642. STEVENS, H. E. **Florida citrus diseases.** Florida Agric. Exp. Sta. Bull. 150: 15–110. *Fig. 6–54.* Aug., 1918.—The bulletin is intended to bring together information relating to all citrus diseases in Florida. Besides parasitic diseases it treats also "a few other diseases and injuries where such are common, unusual or likely to be confused with some other diseases." Part of the bulletin gives limited information on the care of the grove, fungicides, spraying and antiseptics. The following diseases and injuries are treated; withertip, anthracnose, tear stain and bloom blight all due to *Colletotrichum gloeosporioides;* foot-rot (*Phytophthora terrestria);* gummosis and its psorosis type, cause undetermined; blight, cause undetermined; scaly bark (*Cladosporium herbarum* var. *citricolum*); citrus canker (*Pseudomonas citri*); scab (*Cladosporium citri*); citrus knot (*Sphaeropsis tumefaciens*); several leaf spots, cause undetermined; sooty mold, name of fungus not given; (*Septobasidium pedicillatum*) algal leaf and bark spot (*Cephaleuros virescens*); lichens, names not given, causing leaf and bark spots; frenching, probably caused hy lack of humus in the soil or sometimes by lightning, or poor drainage; black melanose or greasy spot, cause undetermined; dodder (*Cuscuta* sp.); cassytha (a plant in its habits similar to dodder) sunscald, lightning and cold injuries.—*C. D. Sherbakoff.*

643. TEMPLE, C. E. **Report of the state pathologist.** Rept. Maryland Agric. Soc. 2: 161–169. Mar., 1918.—Reports the spread of plant diseases favored by the wet weather in 1917; 4000 bushels of seed wheat treated for smut; inspection and quarantine against white pine blister rust, not yet found in Maryland; certification of 10,000 bushels of potatoes for the Western Maryland seed potato growers; the use of two Fusarium-resistant tomato selections and the production of seed of the same on a large scale; detailed discussion of successful experiments in spraying for Septoria tomato blight. Other diseases discussed are pear and apple blight, peach yellows, bacterial leaf spot of peach and *Phoma persicae.*—*J. B. S. Norton.*

644. THOMAS, H. E. **Vegetable diseases. Vanilla diseases. Citrus diseases.** [*In:* Report of the Plant Pathologist.] Porto Rico (Federal) Agric. Exp. Sta. Rept. 1917: 28–30. 1918.—Brief notes on vegetable diseases as follows:—A wilt disease of beans (caused by an undetermined Phycomycete); lima bean rust (caused by *Uredo concors*, and sometimes followed by *Isariopsis griseola*); bean powdery mildew (caused by *Erysiphe polygoni?*); which was easily controlled by dusting with equal parts of lime and flowers of sulfur; cabbage black rot (caused by *Ps. campestris*); tomato downy mildew (caused by *Phytophthora infestans*); leaf mold (caused by *Cladosporium fulvum*); and wilt (caused by *B. solanacearum*). Other less important disease-producing organisms observed: *Cercospora beticola* on beets, *Plas-*

mopara cubensis on melons, *Cercospora hibisci* on okra, *Cercospora personata* on peanut, *Phytophthora infestans* on potato, *Cercospora cruenta* and *Isariopsis griseola* on bean.—Spotting of vanilla leaves observed. Chiefly due to the alga, *Mycoidea parasitica*, and occasionally to *Gloeosporium rufomaculans*.—A root disease, apparently new, is mentioned. A species of Fusarium repeatedly isolated; infection experiments under way.—The withertip fungus (*Colletotrichum gloeosporioides*) of citrus, and the citrus scab fungus (*Cladosporium citri*) were active during the year. Cereal diseases observed: leaf spot of corn, due to *Helminthosporium inconspicuum*; rice blast, caused by *Piricularia oryzae*, and wilt of wheat, caused by *Sclerotium rolfsii*.—*L. R. Hesler.*

645. White, T. H. **Fertilizing and cultural experiments with Irish potatoes.** Maryland Agric. Exp. Sta. Bull. **215**: 151–174. Mar., 1918.—Injury to the seed piece from excess of fertilizer in the row, sulfur and slaked lime is reported, while raw phosphate rock and, especially, dry Bordeaux on the seed piece gave a better stand. Acid phosphate and wet germicides on the seed piece were injurious. The effect of cutting, storage and source of seed on stand and yield are described.—*J. B. S. Norton.*

646. Wicks, W. H., and C. H. Heard. **Bean growing in Arkansas.** Arkansas Agric. Exp. Sta. Circ. **41**: 1–4. April, 1918.—Popular presentation giving brief report of varietal tests and control of common diseases.—*John A. Elliott.*

647. Wilson, Orville Turner. **A storage fermentation of dasheens.** Phytopath. **8**: 547–549. *1 fig.* Oct., 1918.—"Tubers" of *Colocasia esculenta* were found in which the tissue was of the consistency and appearance of a commerical moist yeast culture and which emitted an odor of fermentation. A yeast was isolated which on inoculation set up fermentation in healthy tubers. "True parasitism of the yeast is not established by the observations but rather its capacity to initiate and carry on a fermentation in the injured tissues, which in turn spreads to surrounding healthy tissues."

648. Wolf, Frederick A. **Intumescences, with a note on mechanical injury as a cause of their development.** Jour. Agric. Res. **13**: 253–260. *1 fig., pl. 18–19.* Apr. 22, 1918.—Following a brief introductory discussion of plant intumescences in general and theories regarding their cause, an outbreak on cabbage, following a severe wind storm, is described and attributed to the stimulus resulting from mechanical injury occasioned by wind-blown sand. The proximate cause is believed to be a problem of absorption due to a heightened hydration capacity of the cell colloids resulting from acid production by oxidation. [See Bot. Absts. 1, Entry 735.]—*H. A. Edson.*

PHARMACOGNOSY

Henry Kraemer, *Editor*

649. [Anonymous.] **A possible new source of thymol.** Agric. News [through Chem. and Druggist **90**: 815. 1918].—*Ocymum viride*, native of West Africa and abundant in Sierra Leone, has been cultivated experimentally in the Seychelles. The green shoots from plants eight months old yielded 0.45 per cent of oil which contained 52 per cent of thymol. It was estimated that the yield of oil per acre from one cutting would be 35 pounds and that four or five cuttings could be made annually. It is suggested that the cultivation of this plant be continued in Seychelles and be introduced into the West Indies.—*E. N. Gathercoal.*

650. Anonymous. **Tunis caraway.** Chem. and Druggist. **90**: 796. 1918.—Holland, which cultivates 20,000 acres of caraway, normally supplies the London market with caraway for medicinal and culinary purposes. Due to the recent abnormal shortage of this article in the London market, Indian dill-seed (*Peucedanum Sowa*) has been sold as a substitute but is very inferior to the Dutch caraway. Mogador caraway from Morocco is suitable only

for distilling oil for perfuming soap. "Levant" caraway from Tunis, a novelty in the London market, is the most acceptable substitute for the Dutch article so far offered. North Russian caraway is especially suited for the flavoring of the liqueur known as kümmel but yields very little volatile oil.—Caraway cultivation as an industry of the United Kingdom is urged, and the Board of Agriculture is requested to ascertain the best varieties of *Carum Carvi* and the most favorable conditions of soil, moisture, fertilizer, etc., for insuring the largest yield of volatile oil for use in soap-manufacture, of oil containing the most carvone for chemical and medicinal uses and of oil possessing the finest flavor for the manufacture of liqueurs.—*E. N. Gathercoal.*

651. [Anonymous.] **Report of Agricultural Department of Dominica: West Indian oil of bay.** Kew Bull. No. 5, p. 158. May, 1918.—West Indian bay oil is distilled from the leaves of *Pimenta acris* Kostel, and is used in the preparation of bay rum. The leaves of two varieties of *P. acris* known locally as "Bois d'Inde Citronelle" and "Bois d'Inde Anise" are frequently admixed with the leaves of the true bay to the great detriment of the oil subsequently distilled. The oil from the "Citronella" variety (*P. acris var. citrifolia*) contains citral and has the flavor of lemon. Why the oil from the "Anise" variety does not reach the desired standard is not yet clear.

The leaves have been submitted to Kew but no distinctions can be found between the three varieties except that the crushed leaf of *citrifolia* possesses the lemon-like odor.

The varietal forms intermingle in extensive wild growths near the coasts of many of the West Indian islands and the leaves are gathered indiscriminately. Much harm has already resulted to the bay oil industry and it is a matter of great concern to the distillers that either some method be determined for distinguishing the undesirable leaves or that plantations of the true *P. acris* be established.—*E. N. Gathercoal.*

652. [Anonymous.] **Eucalyptus oil.** Chem. and Druggist 90: 811. 1918 [Editorial].—The eucalyptus oil industry in Australia is of an importance comparable to the lemon oil industry of Italy. Both play an important part in the economic welfare of the respective countries. Although there are 300 species of eucalypts in Australia less than twenty-five of these can be utilized for their oil. *E. Macarthuri* is now receiving special attention in Australia as it is a very rapid grower and its oil contains 60 per cent of geranyl acetate.

The annual production of the oil (nearly a million pounds) has been well maintained within recent years but, owing to restricted transportation, large stocks have been accumulating which will soon compel distilleries to close, while in the London market a shortage of the oil is experienced with a consequent rise in price.—*E. N. Gathercoal.*

653. [Anonymous.] **Saponiferous plants as soap substitutes in Germany.** Seifenfabrikant 37: 374. 1918. [Through J. Soc. Chem. Ind.]—Natural soap substitutes, occurring in certain plants are recommended in view of the shortage of fat and soap. The soapwort (*Saponaria officinalis*) contains in the leaves, stems and especially in the roots abundant amounts of saponin, producing a thick soap lather in water. The fresh roots are thoroughly washed, dried, and reduced to as fine a powder as possible, which is used directly as such for the hands or with soda for linen. Other common plants, although their saponin content is lower than that of soapwort, can also be used, namely ragged robbin (*Lychnis Flos-cuculi*), bachelor's button (Melandryum species), flaxweed (Silene species), corn cockle (*Agrostemma Githago*), rupture wort (*Herniaria glabra*), etc.—*Arno Viehoever.*

654. [Anonymous.] **Japanese agar agar.** Chem. and Druggist 90: 50. June, 1918.—Agar is prepared by the same primitive methods in vogue for the last three centuries; though recently a new company has been projected to combine many small concerns and develop a real factory industry. Most of the product is exported, the exports being two to three million pounds. China is a large buyer and before the war Germany also led. Since the war Great Britain has been first but now the United States leads in the amount purchased.—*E. N. Gathercoal.*

655. [Anonymous.] **Valerian root.** Chem. and Druggist 90: 50. June, 1918.—The demand for this drug far exceeds the supply in England, as it is extensively used in the treatment of shellshock. The price has trebled since the war began. Indian valerian is as valuable as English-grown valerian and more agreeable to the taste. The Japanese valerian has an unpleasant flavor and gives a different taste to the tincture. English herb-growers should increase their plantings using all the available suckers this season. Other drugs such as Scutellaria and Cypripedium might be used as nerve-tonics.—*E. N. Gathercoal.*

656. [Anonymous.] **The castor oil industry.** Chem. and Druggist 90: 43. June, 1918.—British production from castor beans imported from India is from 3500 to 4000 tons per month but the government uses practically all of this for motor lubrication. None of the finest water-white medicinal oil is found in pharmaceutical trade for only neutralized second-grade of oil is released by the Castor Oil Committee and this is rationed in amount far below the needs of the trade.

The demand in the United States is also very heavy and here an effort has been made to plant 200,000 acres with Indian seed, government contracts being made with growers to take the seed at $3.00 to $3.60 per bushel.

India exported in 1916-17, 1,723,000 gallons of castor oil and a large quantity of seed, though no figures are available as to the actual quantity of castor oil produced in India. It is used very extensively as a burning oil in lamps and as a lubricant.

In the West Indies it is estimated that 100,000 acres have been planted with Indian seed and in Brazil its cultivation has been largely extended. *E. N. Gathercoal.*

657. [Anonymous.] **Herb crops.** Chem. and Druggist, 90. June, 1918. Mention is made of satisfactory crops at Mitcham of marshmallow, southernwood, tansy, hyssop, red sage, balm and chamomile. Rue, peppermint, scullcap and pennyroyal are thin crops. Thyme, mint, sage and savory are very satisfactory.—*E. N. Gathercoal.*

658. Asahina, Yasuhiko, and Sentaro Mayeda. **The Korean Ko-Woren.** Yakuga kuzasshi. March, 1918. [Through Jour. Pharm. et Chim.]—The Korean drug represents the rhizome of *Jeffersonia dubia* Benth. and Hook. (*Berberida ceae*) while the Chinese drug of the same name is derived from *Picrorrhiza Kurrooa* Royl. (Scrophulariaceae). The anatomy of the Jeffersonia d. rhizome is described in detail and the resemblance to the hydrastis rhizome mentioned. No berberine was found, confirming thus in a way Gordin's results with the American species *Jeffersonia diphylla*, in which he, contrary to other authors could not find any berberine. Another alkaloid however was isolated, yielding an amorphous carbonate, melting towards 210°C. with decomposition, sol. in water, less sol. in alcohol and acetone and not at all in ether. The picrate was amorphous, the double salts with gold or platinum chloride were confusedly crystalline.—*Arno Viehoever.*

659. Bacharach, Alfred Louis. **Two plant products from Columbia.** Analyst 43: 289. 1918.—I. Oil of *Jessenia polycarpa* Karst.—This oil is from the nut of the "sejen" or "unamo" palm, known locally as "aceite de sejen" (oil of palm). In the llanos of San Martin it is considered to be superior to cod-liver oil for use in chest and lung complaints. It is also used in cooking. It is refined locally and finds a ready sale in the drug stores of Bogota and other Columbian towns.—The oil is pale yellow, has a slight fluorescence and not unpleasant odor; somewhat refractive and does not become rancid with time. It reacts similar to olive oil in the "elaïdin" test and is miscible in all proportions with ether, acetone, petroleum spirit, light petroleum, benzene, chloroform, carbon tetrachloride and ethyl acetate but not with water, absolute alcohol, 95 per cent rectified spirit and glacial acetic acid. A table shows the various analytical values as compared with those of olive oil. The only notable difference is in the iodine values of the oils. The oil could, presumably, be used for all purposes for which olive oil is employed.

II. Seeds of *Caryodendron Orinocense* Karst.—These seeds are used at Villarvicencio, in the llanos of San Martin, where they are roasted and eaten, being known locally as "Tacay."

They sell readily at about 3 d. per pound. The seeds have a greyish-brown brittle husk, and are of a whitish color, fairly tough, 23 to 27 mm. long, 15 to 20 mm. broad and weigh about 3.1 gm.—The composition is similar to that of Walnuts. The analytical values of the ether extract are given. The taste of the roasted nuts is similar to burnt almonds.—*C. J. Zufall.*

660. Baljet, M. H. **Localisation of the active glucosides in the leaves of the genus Digitalis.** Schweiz. Apoth. Ztg. **56**: 247. 1918. [Through Jour. Pharm. et Chim.]—With means of sodium picrate reagent (one drop of 1 per cent picric acid sol. mixed with one drop of 10 per cent sod. hydroxide sol.) applied to sections, the cells containing the glucosides are colored orange within 1 or 2 minutes. In all the species of Digitalis studied, including *D. purpurea, lutea, ambigua,* the glucosides were thus located in the epidermal cells, the non-glandular hairs, in the endodermis of the vascular bundles and sometimes in the subepidermal collenchyma. The leaf margin (epidermis and endodermis) gave the strongest reaction, the base of the petiole only a very faint one. In many leaves the upper epidermis reacts, the lower not, supporting thus—according to the author—the viewpoint that glucosides are waste products.—*Arno Viehoever.*

661. Ballard, C. W. **Wild Anthemis, a possible matricaria adulterant.** Jour. Amer. Pharm. Assoc. 7: 952–4. 1918.—Flowering heads of the wild grown *Anthemis nobilis* Lin. were offered as Chamomile or Spanish Chamomile. They contain more volatile oil and bitter principles than the cultivated and are probably more active, but more liable to produce nausea. As the one-time official Roman Chamomile was the cultivated flowering head, the wild product bears little resemblance to it; in fact, it has a greater resemblance to the German Chamomile, *Matricaria Chamomilla* Lin. The distinguishing characters showing the difference between these three drugs are summarized and the powdered drug of Wild Anthemis is illustrated and its histology given in detail.—*O. A. Farwell.*

662. Bohrisch, P. **The sulphuric acid test for Strophanthus seeds.** Pharm. Ztg. **63**:318. 1918. [Through Jour. Soc. Chem. Ind.]—Of the various modifications proposed for the carrying out of the test the following procedure is recommended: Thin cross-sections of the seeds (*Str. Kombé*), placed on an object glass and treated with ether to remove the fat, are covered with one drop of sulphuric acid, containing ½ of its weight of water. The deep green coloration, indicating the presence of strophanthin, should, especially when some magnification is used, be observable in the endosperm and at least the outer portions of the embryo. When big sections, seeds cut in half, were used, the results of the test were very variable and indefinite.—*Arno Viehoever.*

663. Cocking, T. Trusting, and James D. Kettle. **The evolution of balsam of tolu.** Pharm. Jour. **101**: 40. 1918.—The method of the British Pharmacopoeia (1914) for the estimation of the aromatic acids in storax would not be used for the estimation of these acids in balsam of tolu. However, boiling out the aromatic acids with magnesium oxide and water, in the presence of a small quantity of xylene to soften the resinous matter was found to satisfactorily extract these acids from balsam tolu.—A table of analytical data is appended exhibiting for fourteen samples the acid value, ester value, saponification value, percentage of free and combined benzoic and cinnamic acids, etc. The percentage of total balsamic acids present ranged from 32.66, to 47.56 with the exception of two samples containing 24 per cent, which were probably sophisticated. These two samples also were low in ester value but were high in acid value and saponification value. It is recommended that, in the pharmacopoeia, limits of ester value be adopted instead of saponification value.—*E. N. Gathercoal.*

664. Ewing, C. O. **Karaya gum, a substitute for tragacanth.** Jour. Amer. Pharm. Assoc. 7: 787–90. 1918.—Shows that the relative values of commercial gums depends upon the purposes to which they are best suited, those suitable for pharmaceutical requirements being rated amongst the most valuable. One of the most valuable is gum Tragacanth, official in the U. S. P. IX and defined as the dried gummy exudate from *Astragalus gummifer* Labil.

or from other Asiatic species of *Astragalus*. Substitute gums have been derived from *Sterculia urens* Roxb., *S. villosa* Roxb., *S. Tragacantha* Lindl., *Cochlospermum Gossipium* DC. or from other species of these genera. These gums are known under a large number of vernacular names in India, one of them being *Karaya*. It occurs in irregular, rounded, translucent lumps of a pale buff color, *without* the *ribbon-like bands* characteristic of true Tragacanth, but in the powdered state may readily be mistaken for it. The volatile acidity of gum from *Cochlospermum*, when hydrolized with phosphoric acid and distilled, corresponds to about 14 or 15 per cent of acetic acid; of *Sterculia* to about 16 per cent; and of *Astragalus* to only 2 or 3 per cent. Karaya gum is considered to be about equal to true Tragacanth as an emulsifying agent, and is used extensively in India as a substitute for it; the author, however, thinks that when used as an emulsifying agent about ½ to ¼ more should be used; he also suggests that a solution could be used as a substitute for glycerin.—*O. A. Farwell.*

665. Ewing, C. O., and J. F. Clevenger. **So-called Syrian alkanet, Macrotomia Cephalotes DC.** Jour. Amer. Pharm. Assoc. 7: 591–4. 1918.—This is a root much longer (20 to 40 cm.) and thicker (2 to 5 cm.) than the true Alkanet, *Alkanna tinctoria* Tausch, and is many-headed while the true is few-headed; the color is black-violet, somewhat metallic, that of the true being a dull maroon; it is distinctly spirally twisted. The Syrian was freer from sand but true Alkanet had a fine sprinkling of it. The coloring extracts of each are very similar in nature and consist of at least two chemical substances. The coloring extract in the Syrian is present in much larger quantities than in the true and, as it is of equal tinctorial strength, may be considered to be a valuable substitute.—*O. A. Farwell.*

666. Ewing, C. O., and J. F. Clevenger. **Piptostegia root, Piptostegia Pisonis Mart., so-called "Brazilian jalap."** Jour. Amer. Pharm. Assoc. 10: 855–858. 1918.—Material offered for entry as "Jalap" proved upon investigation to be the root of *Piptostegia Pisonis* Mart., referred to by Holmes as "the ordinary Jalap from Brazil." A macroscopical description of the root is given, as also several photographs of transverse sections.—Preliminary experiments by the authors confirm Passmore's report that "over 20 per cent of resin answering to all of the B. P. and U. S. P. VIII tests for the resin of true or Vera Cruz jalap, but only 0.85 per cent is soluble in ether," but indicates that the drug possesses considerable cathartic power, yet quite dissimilar to that of true jalap. Assay of the root, according to U. S. P. method yielded 23 per cent of resin. The specific rotation proved to be −48.5 compared to that of true jalap, which is reported to be in the neighborhood of −36 to −37. A comparison of the resin contents and specific rotations is included in a tabulated report on several of the Convolvulaceous roots, e.g., Piptostegia, Jalap, Scammony, Mexican Scammony and Morning Glory. A marked dissimilarity of Piptostegia root is noted, especially compared with that of Jalap. The results of the pharmacological experiments are also discussed. —*A. Hogstad, Jr.*

667. Faes, M. H. **Pyrethrum and its culture.** Schweiz. Apoth. Ztg. 56: 429. 1918. [Through Jour. Pharm. et Chim.]—The successful plantation in Switzerland is discussed of plants, yielding insect flowers, grown from seeds of *Chrysanthemum cinerariaefolium*, originated in Dalmatia and neighbouring states. The cultivation, collection, etc., are described in detail. The material obtained was of the same quality as that grown in the countries of foreign origin. Faes recommends the application of insect powder, suspended in black-soap sol in the fight of Cochylis, destructive to vineyards, and points out that the action of pyrethrum on the eggs is more effective than nicotine in certain respects.—*Arno Viehoever.*

668. Faes, H. **Cultivation of insect flowers.** Schweiz. Apoth. Ztg. 56: 429. 1918.—True Dalmatian insect-flowers, *Chrysanthemum cinerariifolium*, are now being cultivated in Switzerland. Seed from Austria, Hungary and Dalmatia has been tried since 1912. By 1917, 97 plantations carrying 25,000 plants had been established. The seed from spring flowers sown in shallow trenches in rather stony soil with a south aspect will produce hardy plants that first bloom about mid-June of their second year. The flowers are gathered before

expanding thus furnishing the "closed" and "half-open" commercial varieties. An aqueous extract of the flowers is used in black-soap solution as a spray for vineyards. The commercial demand for the flowers is steady and the grower is certain of a market for his product.—*E. N. Gathercoal.*

669. Farwell, O. A. **Brazilian jalap and some allied drugs.** Jour. Amer. Pharm. Assoc. **10**: 852–855. 1918.—According to the deductions made by the author, the proper binomial for Brazilian Jalap is *Operculina macrocarpa* (Linn.) Urban. In Brazil the drug is commonly known as *Batata de purga* and *Batata purgante*. *Tapioco de Purga* is a product derived from the root. The generic characters of Operculina and a description of the root follow.—An examination of material procured from London agreed in all points with that of the description, and in transverse section bears resemblance to the roots of Mexican Scammony, Poke and, more pronounced, to those of White Bryony. These resemblances are readily noted by a comparison of the photographs included in the article.—The author goes on to describe the root, yielding Resina Drastica, which is of unknown origin and Mexican Scammony derived from the tuberous roots of *Ipomoea Orizabensis* (Pell) Ledenois, which is known as Male or Orizaba Jalap. From the resemblances of the root yielding Resina Drastica, to that of Brasilian Jalap and Mexican Scammony, the author hazards the guess that it is from some plant closely allied to them, consequently from the Convolvulaceae.—*A. Hogstad, Jr.*

670. Hill, C. A. **Supplies of vegetable drugs.** Presidential address before British Pharmaceutical Conference, 1918. Pharm. Jour. **101**: 19. 1918.—A *résumé* of British drug stocks after four years of war, with the whys and wherefores of increased prices, shortages, etc. About forty principal drugs are dealt with.—*E. N. Gathercoal.*

671. Hill, A. W. **The genus Strychnos in India and the East.** Kew Bull. 1917. Page 121.—Ninety-two species are described. Those of pharmacognostical interest besides *S. Nux-vomica* and *S. Ignatia* are *S. colubrina*, Linn., yielding Lignum Colubrinum of mediaeval pharmacy; *S. quadrangularis*, Hill, from which the Malayan arrow-poison "Spoh aker" is obtained; *S. Gaultheriana*, Pierre, which supplies Hoangnan Bark, introduced from Cochin China as remedy for leprosy, and *S. Nux blanda*, Hill, of Burma, which produces a seed very similar in appearance to Nux vomica but devoid of strychnine or brucine. *S. Nux-vomica* appears to be a variable plant and it would be useful to submit authentic seeds of the different varieties and of species allied to it, to determine which are the richest in strychnine.—*E. N. Gathercoal.*

672. Holm, Theo. **Medicinal plants of North America.** Merck's Rept. **27**: 115–7, 168–70. 1918.—The author discusses both *Juglans nigra* Lin. and *Juglans cinerea* Lin., contrasting these with *Carya* and *Platycarya* and giving a general botanical description with illustrations of the flowers and of the histology of the root. The internal structure of the vegetative organs is described in detail. The roots of the two species are identical as regards structure and the stems of *J. cinerea* differ from those of *J. nigra* only in the stereome which represents almost closed sheaths and being interspersed with large, very thin-walled, and porous sclereids.—*O. A. Farwell.*

673. Scoville, W. L. **Brazilian jalap.** Jour. Amer. Pharm. Assoc. **9**: 785–787. 1918.—An examination of Brazilian Jalap, *Piptostegia Pisonis*, showed that the resin from this drug is a complex body of glucosidal nature, similar in chemical character and contains constituents of like character to that of *Exogonium Purga.* The resin meets the requirements of the U. S. P., with the exception of solubility in water and acid number. The yield is three to four times as great and the physiological action is similar. Detailed results of the examination are given.—*A. Hogstad, Jr.*

674. Spiegel, L., and A. Meyer. **Saponin from mowrah seed.** Ber. Deutsch. Pharm. Ges. **28**: 100. 1918. [Through Jour. Chem. Soc.]—The saponin mowrin, formerly isolated

from mowrah seeds (*Bassia longifolia*) was found to be a mixture of 2 substances, the main one, $C_{42}H_{68}O_{25}$, being more soluble in alcohol and yielding upon hydrolysis laevulose, arabinose and mowric acid. *This acid is a mixture of a crystalline mowragenic acid*, $C_{19}H_{28}O_{5}$, and an amorphous mowragenic acid, $C_{19}H_{30}O_{16}$. Careful hydrolysis with dilute acetic acid yielded an intermediate pentoside, $C_{29}H_{50}O_{18}$.—*Arno Viehoever.*

675. Viehoever, A., C. O. Ewing and J. F. Clevenger. **Commerical viburnum barks and preparations.** Jour. Amer. Pharm. Assoc. 7: 944–52. 1918.—Discusses commercial barks derived from *Viburnum Opulus* Lin., *V. prunifolium* Lin., and *V. Lentago* Lin. and the substitution of the bark of *Acer spicatum* Lam. for that of the first named above. Black Haw (*V. prunifolium* or *V. Lentago*) was generally true to name but Cramp Bark was generally *Acer spicatum*. The barks of both the stems and roots of all four species are illustrated in *cross sections and the distinguishing characters of each pointed out*. The Viburnum tannins give a green color with iron salts whereas a blue color is developed by the Maple tannins.—*O. A. Farwell.*

PHYSIOLOGY

B. M. Duggar, *Editor*

[Unsigned abstracts are by the editor.]

676. Fischer, M. H. ***The colloidal-chemical theory of water absorption by protoplasm.* A fifth response to some criticisms.** Jour. Amer. Chem. Soc. 40: 862–867. 1918.

677. Henderson, L. J. **On the swelling of protein colloids. A reply.** Jour. Amer. Chem. Soc. 40: 867–868. 1918.

678. Henderson, L. J., and E. J. Cohn. **On the swelling of protein colloids. A reply to Professor Martin H. Fischer.** Jour. Amer. Chem. Soc. 40: 857–861. 1918.

679. Lloyd, F. E. **The colloidal properties of protoplasm: Imbibition in relation to growth.** Trans. Roy. Soc. Canada III, 11: 133–139. *1 fig.* 1917.—In the growth of pollen tubes of *Phaseolus odoratus* imbibition pressure is a dominant factor. This is shown by the fact that growth rates vary inversely with the concentration of the medium (up to 50 per cent of cane-sugar). The pollen bursts in water and after brief initial growth in concentration up to *ca.* 20 per cent. In this maximum rates without bursting occur. By combining acids and alkalis in connections from n/400 to n/25,600 with 20 per cent cane sugar, a maximum growth rate was found to occur at *ca.* n/3,200 of the acid (acetic) and of the alkali (sodium hydrate) component, the rates being lower for both higher and lower concentrations. In higher concentrations coagulation occurs; in lower, excessive imbibition and bursting.

The swelling rates of gelatin were also studied. It was substantiated that there is a *concentration of acid which induces maximum rate (above n/640) and it was found that the* same is true for alkalis. It was further found that the maximum rate occurs first at high concentrations, but as time elapses, at successively lower concentrations. For inorganic acids the maximum rate occurs at lower concentrations than for organic acids. There is also a concentration (of acid and of alkali) at which a minimum swelling rate less than that for water occurs.—It is argued that an analogy obtains between the living protoplasm and gelatin, but the wide differences of effective concentrations are to be noted. [See Bot. Absts. 1, Entry 680.]—*F. E. Lloyd.*

680. Lloyd, F. E. **The effect of acids and alkalis on the growth of the protoplasm in pollen tubes.** Mem. Torr. Bot. Club 17: 84–89. 1918.—Contents *of this paper are included* in abstract under preceding Entry, 679.

681. MacDougal, D. T. **Annual report of the director of the Department of Botanical Research.** Carnegie Inst. Washington, Year Book 16: 59–98. 1918.—Brief reports on the projects (mostly physiological) under investigation by the staff of the Desert Botanical Laboratory, Tucson, Arizona.

682. Clowes, G. H. A. **On the action exerted by antagonistic electrolytes on permeability of emulsion membranes.** Proc. Soc. Exp. Biol. and Med. 15: 108–111. 1918.—A preliminary note indicating that artificial membranes of filter paper saturated with an emulsion of oil and soap exhibit variations in electrical conductivity and permeability under the influence of antagonistic agents corresponding to those which have been found for living plant tissues.

683. Clowes, G. H. A. **On the electrical resistance and permeability of tumor tissues.** Proc. Soc. Exp. Biol. and Med. 15: 107–108. 1918.—Preliminary determinations indicate that cancer tissues and tissues derived from plant galls are uniformly more permeable than normal tissues. It would appear that permeability bears some relation to proliferation and speed of growth.

684. Harris, J. A. **On the osmotic concentration of the tissue fluids of desert Loranthaceae.** Mem. Torr. Bot. Club 17: 307–315. 1918.—Continuing work on the general subject of the osmotic pressure of parasitic *Loranthaceae*, it is developed that in three desert forms concentration of the tissue fluids is approximately twice as great as that of species in the montane rain-forest of the Jamaican Blue Mountains. [See Bot. Absts. 1, Entry 828.]

685. Stiles, Walter, and Ingvar Jörgensen. **Quantitative measurement of permeability.** Bot. Gaz. 65: 526–533. 1918.—A polemical paper and critique. After certain practical suggestions on the complexity of the system involved in cell permeability phenomena, the authors take issue with Osterhout as to the validity of his critism of their work. They further discuss the published work of Osterhout regarding the "permeability of the protoplasm" under three heads; namely: "(1) which part of the system it is, the permeability of which he intends to measure; (2) how far the values he obtains for the electrical conductivity of plant tissues are true measures of this conductivity; and (3) whether it is legitimate to assume that the electrical conductivity is a measure of the permeability." They conclude (1) that to have his results accepted he must define permeability in a quantitative sense, (2) prove that his method gives values for the conductivity of the tissue employed, and (3) furnish evidence that electrical conductivity of tissue is a measure of permeability as he employs the term.

686. Thoday, D. **On turgescence and the absorption of water by the cells of plants.** New Phytol. 17: 108–113. 1918.—The writer gives a brief "elementary exposition of the conditions which govern the equilibrium of a cell with a watery solution and with other cells" and illustrates the consequences by applying them in definite cases.—*Zeller* (St. Louis).

687. True, R. H. **Notes on osmotic experiments with marine algae.** Bot. Gaz. 65: 71–82. 1918.—In an endeavor to ascertain the osmotic value of the sea water at Woods Hole, Massachusetts, the author first studied certain fresh water algae the cells of which were found to have an osmotic equivalent of from 6.7 to 7.2 atmospheres as measured by cane sugar and sodium chloride respectively. The pressure found corresponds to a 30 per cent sea water solution. The plasmolytic data indicate that the sea water has an osmotic value of 22.6 atmospheres, whereas determined cryoscopically by Garrey it was 23.8 atmospheres. The osmotic surplus of *Cladophora*, *Enteromorpha*, and *Chaetomorpha* was 6.6 and 11.7 atmospheres when determined respectively by cane sugar and sodium chloride—the great difference being explainable on the basis of the greater penetrability of the latter.

688. Duggar, B. M., and W. W. Bonns. **The effect of Bordeaux mixture on the rate of transpiration.** Ann. Missouri Bot. Gard. 5: 153–176. *Pl. 10.* 1918.—In continuation of

earlier work extensive experiments are conducted on potted tomatoes, potatoes, marguerites tobacco, and umbrella plants, and also on excised leaves of the castor bean. All tests were made on a table, or carrier, arranged to give general horizontal rotation as well as rotation of the individual pot carriers. Under the conditions maintained in the greenhouse it was found that a film of Bordeaux mixture, and certain other analogous materials, effect an increase in the rate of transpiration of the usual potted mesophytic plants, which is mainly if not entirely, confined to the night intervals. The excised leaves exhibit a similar transpiration increase as a result of the presence of the spray. On the other hand, potted *Cyperus esculentus* shows no augmentation of transpiration rate. The facts are interpreted as suggesting that under night conditions there may be assumed to exist in such mesophytic types a state of guttation, or incipient guttation and that accordingly a "bibulous" surface film would facilitate the molar movement of water and possibly greatly increase the actively evaporating surface. It is assumed that a condition approaching guttation may not be realized in *Cyperus*.

689. Allison, F. E. **Some availability studies with ammonium phosphate and its chemical and biological effects upon the soil.** Soil Science 5: 1–80. *Fig. 1–10.* 1918.—Since the development of a method satisfactory for the manufacture of ammonium phosphate it has become important to establish the conditions under which this nutrient may be economically applied for the growth of various crops. This paper includes the results of an extensive laboratory and greenhouse study employing the usual tumbler, fresh-soil method. In general it is found that ammonium phosphate is a fertilizer of the same general type as those usually furnishing nitrogen and phosphate and the value is equivalent to the amount of nitrogen as ammonium sulphate and of phosphorus as acid phosphate. The nitrification experiments show an increase in nitrate accumulation in garden and meadow soil followed by a decline indicating nitrate assimilation by the micro-organisms. Calcium carbonate promoted nitrification, but calcium oxide did not. In this case the ammonium phosphate gave results similar to ammonium sulphate.—With respect to the effect of the ammonium phosphate upon germination the results are comparable with those of other fertilizers, an application of 150 pounds or more being the limit per acre in the experiments with corn.

690. Ayers, S. H., and P. Rupp. **Simultaneous acid and alkaline bacterial fermentations from dextrose and the salts of the organic acids respectively.** Abst. Bact. 2: 11. 1918.

691. Buchanan, R. E. **Determination of the fermentation capacity of a single bacterial cell.** Abst. Bact. 2: 11. 1918.

692. Bunker, J. W. M. **Further studies on the effect of H-ion concentration upon the diphtheria bacillus.** Abst. Bact. 2: 10. 1918.

693. Clark, W. M. **Remarks upon the use of indicators.** Abst. Bact. 2: 10. 1918.

694. Cohen, B., and W. M. Clark. **The influence of the P_H of media upon the reproduction of some common bacteria.** Abst. Bact. 2: 10. 1918.

695. Corson, G. E., and A. L. Bakke. **The use of iron in nutrient solutions for plants.** Proc. Iowa Acad. Sci. 24: 477–482. *Fig. 95–98.* 1917.

696. Doryland, C. T. J. **The possibility of obtaining nitrogenous fertilizers by utilizing waste materials for the fixation of nitrogen by nitrogen-fixing bacteria.** Abst. Bact. 2: 2. 1918.

697. Fred, E. B. **Studies of the reactions of media for higher plants and bacteria.** Abst. Bact. 2: 10. 1918.

698. GIBBS, W. M., AND E. B. FRED. **Isloation and study of the nitrifying organisms.** Abst. Bact. 2: 1. 1918.

699. GILLESPIE, L. J. **The growth of the potato-scab microorganisms at various hydrogen-ion concentrations as related to the occurrence of potato scab.** [See Bot. Absts. 1, Entry 309.] Abst. Bact. 2: 1. 1918.

700. KOCH, G. P. **The potassium requirements of Bacillus subtilis.** Abst. Bact. 2: 2. 1918.

701. KOCH, G. P. **Potassium requirements of bacteria.** Soil Science 5: 219–224. 1918.—In the work here reported the method is the same as in a previous paper and the same organism, *Bacillus subtilis*, was employed. The results represent therefore the influence of potassium sulphate as shown by the formation of ammonia from dialyzed peptone. It was shown in the first place that the absence of potassium exerts a strong inhibition on ammonia formation and in the second place that the concentration may be varied from .24 mg. to 1.25 without seriously affecting the activity of the organism.

702. KOSER, S. A. **Studies upon bacterial nutrition. The utilization of nitrogenous compounds of definite chemical composition.** Abst. Bact. 2: 12. 1918.

703. LEFEVRE, E. **A preliminary study of salt organisms.** Abst. Bact. 2: 7. 1918.

704. LIPMAN, C. B. **The significance of the sulfur in sulfate of ammonia applied to certain soils.** Soil Science 5: 81–86. 1918.

705. LOEB, J. **The origin of the conception of physiologically balanced salt solutions.** Jour. Biol. Chem. 34: 503–504. 1918.

706. MAQUENNE, L., AND E. DEMOUSSY. **Influence des sels metalliques sur la germination en presence de calcium.** Compt. rend. Acad. Sci. Paris 166: 89–92. 1918.—Continuing in the direction of work previously reported the authors have tested three concentrations of a variety of salts, employing, in general, dilutions somewhat below those which may be considered toxic to the plant for each salt used alone. He used NaCl, KCl, $(NH_4)_2SO_4$, $SrCl_2$, $BaCl_2$, $MgSO_4$, $ZnSO_4$, $MnCl_2$, $PbCl_2$, and $CuSo_4$ and in duplicate tests the same concentrations of these salts together with 0.5 mgm. $CaSO_4$ or 0.4 mgm. $CaCl_2$ in a vessel containing 40 grams of sand and 10 cc. of the salt tested. All the salts except $BaCl_2$ and lower concentrations of $PbCl_2$ lessened the benefits derived from controls in which calcium salts alone were employed.

707. NORTHRUP, Z. **Anaerobic culture volumeter: a simple apparatus for the quantitative and qualitative determination of gas produced by microorganisms.** Abst. Bact. 2: 13. 1918.

708. OSTERHOUT, W. J. V. **The basis of measurement of antagonism.** Jour. Biol. Chem. 34: 363–368. *Fig. 1–4.* 1918.—Along the line of earlier work the author discusses briefly the importance of the additive effect in the measure of antagonism. He endeavors to show by curves and discussion that without knowledge of the additive effect the observed effect may not indicate antagonism except under special conditions, thus giving weight to the necessity of determining this additive effect—defined by him as that effect which would be found if no antagonism existed.

709. PRUCHA, M. J., H. M. WEETER AND W. H. CHAMBERS. **Hypochlorites as a disinfectant for rubber.** Abst. Bact. 2: 19. 1918.

710. Brown, C. W., and J. F. Morgan. **An interpretation of the cycles of carbon, nitrogen and sulfur.** Abst. Bact. 2: 2. 1918.

711. Osterhout, W. J. V. **A demonstration of photosynthesis.** Amer. Jour. Bot. 5: 105–111. *Fig. 1–2.* 1918.—A piece of relatively simple apparatus is described whereby it is possible to demonstrate and to measure photosynthesis. The apparatus permits the removal of samples of the gas so that the progress of the phenomenon may be followed as also the effects of conditions upon it. It is applicable to certain types of respiration study.

712. Osterhout, W. J. V., and A. R. C. Haas. **A simple method of measuring photosynthesis.** Science 47: 420–422. 1918.—It was ascertained that the amount of photosynthesis of aquatic plants, especially algae could be determined by the change in PH value. Marine and fresh water plants caused the water to become more alkaline, the former in natural sea water and the latter in solutions containing bicarbonates. The amount of photosynthesis is approximately a linear function of the change in PH value. Phenolphthalein was used as an indicator.

713. Murray, T. J. **The effect of different plant tissues on the fixation of atmospheric nitrogen.** Virginia Agric. Exp. Sta. Tech. Bull. 15: 93–102. 1917. [Received, 1918.]—To determine the influence of plant material on the nitrogen fixation of Azotobacter the author added 1 per cent of tissue from various grasses, legumes, and a few other plants—21 in all—to Hagerstown silt loam and to sand cultures incubating at 28°C. Nitrogen determinations were made after various intervals with the result that in the case of the Hagerstown silt loam a stimulating action from the addition of all of the organic materials was found with the exception of three, whereas in the sand cultures only twelve produced a slight stimulation of nitrogen fixation.

714. Robbins, W. J. **Direct assimilation of organic carbon by Ceratodon purpureus.** Bot. Gaz. 65: 543–551. *Fig. 1–5.* 1918.—This moss was grown 2.5 months in pure cultures in flasks of 125 cc. capacity. The culture solution consisted of 50 cc. of a mineral nutrient solution with the addition (except in certain controls) of a sufficient amount of the organic compound to make 0.1 mol. Cultures in triplicate were placed in the light and in darkness. The greatest amount of growth in the dark was made with levulose as a source of carbon; apparently considerably less with glucose, cane sugar, and maltose; very little with galactose and lactose; and none with mannite, glycerol, and starch. In all in which growth occurred in the dark starch was also formed. In the light there was growth in all cultures, "showing that none [of the compounds mentioned] was toxic to the moss." Quantitative comparative data are given showing that with levulose the amount of growth was two to seven times greater than with glucose. Abundant protonema were produced in the dark but light is required for the production of the moss plant.

715. Bidwell, G. L. **A physical and chemical study of the kafir kernel.** U. S. Dept. Agric. Bull. 634: 1–6. *Fig. 1.* 1918.

716. Fiske, C. H. **The inhibition of foaming.** Jour. Biol. Chem. 35: 411–413. 1918.—A general discussion of principles involved in the prevention of foaming where air is necessarily forced through solutions such as soaps and proteins. An efficient inhibitor has been found in isoamyl isovalerate. Methods of preparing this compound are given.

717. Givens, M. H. **The composition of dried vegetables with special reference to their nitrogen and calcium content.** Soc. Exp. Biol. and Med. 15: 101. 1918.

718. Hall, H. M., and T. H. Goodspeed. **An emergency supply of rubber.** Science 47: 452–454. 1918.—Brief indications showing the content of rubber in species of *Chrysothamnus*, *Ericameria*, and *Stenotus*.

719. Koessler, J. H. **Studies on pollen and pollen disease. I. The chemical composition of rag-weed pollen.** Jour. Biol. Chem. **35**: 415–424. 1918.—This is an endeavor to work toward a determination of that chemical fraction of the pollen substance inducing hay fever, and the present paper involves a study of chemical composition with particular attention to nitrogen distribution. Two species of *Ambrosia* were employed. A feature of interest in the analyses is the relatively high content of histidin in protein hydrolysis, especially as compared with the amount of arginin. [See Bot. Absts. 1, Entry 1408.]

720. Maclean, H. **Lecithin and allied substances: the lipins. Monograph on biochemistry.** *206 p.* Longmans, Green & Co., London. 1918.—The present volume supplements the monograph by Leathes on fats, and is restricted to the phosphatides and the cerebrosides, which are here designated lipins with the understanding that this term is employed for "substances of a fat-like nature yielding on hydrolysis fatty acids or derivatives of fatty acids and containing in their molecule either nitrogen, or nitrogen and phosphorus."

The author gives a relatively simple classification, including under the phsophatides two representatives of mono-amino-mono, one of di-amino-mono, and one of mono-amino-di phosphatides. Of the cerebrosides phrenosin and kerosin alone are recognized. He regards other forms occurring in the literature as insufficiently established and not definitely isolated. A full account is given of the occurrence, extraction, isolation, and purification of both groups. He regards protagon as a mixture of the two groups referred to and devotes considerable attention to a discussion of insufficiently characterized lipin-like substances. The plant phosphatides are shown to offer one opportunity for future research. The difficulties in the study of these bodies appear to be greater than in the case of corresponding substances in animals. In general, however, the conclusion is derived that there is no essential difference between the two groups. The presence of sugar in the analyses seems to indicate that cerebrosides also occur in plant tissues, but very few attempts have been made to isolate and characterize these bodies. The author concludes that the biological significance of lipins is unknown, and that the views thus far advanced as to their functions are merely suggestive.

721. Pammel, L. H., and A. W. Dox. **The protein content and microchemical tests of the seeds of some common Iowa weeds.** Proc. Iowa Acad. Sci. **24**: 527–532. 1917. [Received, 1918.]—A quantitative study was made of the protein content of about 60 weed seed, likewise microchemical tests to determine qualitatively the amount of starch, protein and fat in a much larger number.

722. Plimmer, R. H. A. **The chemical constitution of the proteins.** Part 1. Analysis. 3rd ed. *XII + 174 p.* Longmans, Green & Co., London, 1917.—A new edition of this monograph is justified by the importance of the contributions which have been made during the past five years in relation to methods of protein hydrolysis and the quantitative estimation of the cleavage products. Extensive data are given showing the nature of various proteins as regards the amino acid constituents and their nitrogen partition. There is eliminated from Part 1 in this edition the description of the amino acids, which is reserved for separate treatment.

723. Richards, H. M. **Determination of acidity in plant tissues.** Mem. Torr. Bot. Club **17**: 241–245. 1918.—A brief discussion of methods of obtaining samples of plant juices as nearly that of the normal tissues as possible for titration purposes.

724. Sando, C. E., and H. H. Bartlett. **The flavones of Rhus.** Amer. Jour. Bot. **5**: 112–119. 1918. Flavone pigments were isolated from *Rhus typhina*, *R. glabra*, and *R. copallina.* Analyses and careful study of the pigments from wood and from leaves enable the authors to verify Perkin's conclusion to the effect that the same flavone is not likely to be found in wood and leaves of the same species. It seems to be established that fisetin is the wood flavone, while myricetin is distinctively the leaf flavone. No relationship between the two flavones, nor between these and the anthocyanins of leaf and berry have been established.

725. TANNER, F. W. **Studies on the bacterial metabolism of sulfur.** Jour. Amer. Chem. Soc. **40:** 663–669. 1918.—*This is a second paper on the general subject stated and is devoted* to a study of the relations of thirty species or strains of yeast-like fungi assembled from various sources. The paper is concerned chiefly with the formation of hydrogen-sulphide from the following sulfur-compounds or sources: peptone; cystine; sodium taurocholate, phenol sulfonate, sulfate, sulfite, and thiosulfate; potassium thiocyanate; thiourea; and free sulfur. Cystine is reduced by all of the organisms studied except one, sodium sulfite by all except six. The other compounds noted are reduced by a considerable number of organisms except that in the cases of sodium phenolsulfonate, and taurocholate, one and two organism respectively are able to effect the reduction. Only eight organisms failed to produce hydrogen sulfide from free sulfur. The test for hydrogen sulfide was made by means of a strip of filter paper treated with saturated lead acetate and a small amount of glycerol, suspended in the culture over the substrate.

726. VIEHOEVER, A., L. H. CHERNOFF AND C. O. JOHNS. **Chemistry of the cotton plant, with special reference to upland cotton.** Jour. Agric. Res. **13:** 353–366. *Fig. 1.* 1918.—This investigation was undertaken in order to isolate the weevil at the same time to determine the products of hydrolysis and to establish whether or not the upland cotton contained the substances formerly isolated from Indian and Egyptian types. It is shown that both quercimeritrin and isoquercitrin are present in upland cotton. Gossypitrin and gossypetin were not found. The investigation revealed the presence of an ethereal oil in *G. hirsutum* dissimilar to that found in the root of *G. herbaceum.*

727. ZOLLER, H. F. **Some constituents of the American grapefruit (Citrus decumana).** Jour. Ind. and Eng. Chem. **10:** 363–374. *Fig. 1–2.* 1918.—After a general discussion of the introduction of the grapefruit and its heralded therapeutic value the author submits analyses of the peel showing the amounts of essential oils (limonene, citral, pinene, and alcohols), the glucoside naringin, and pectin. Citric acid, naringin and pectin are found to decrease with long storage, while reducing sugars and sucrose show an increase. Culls are considered an available source of industrial alcohol.

728. ASAI, TOICHI. **Physiologische Untersuchungen über eine neue, in der Gerbbrühe gedeihende Kahmhefe.** Jour. Coll. Sci. Imp. Univ. Tokyo **39:** 1–42. *Pl. 1–2.* 1918.—The author describes a new yeast, *Mycoderma tannica,* common in the tanning industry. On gypsum blocks it forms no spores at 30°C., but produces resting cells filled with fat and glycogen. The organism grows well on ethyl alcohol as a source of carbon and particularly well on the hexoses but very indifferently upon maltose, lactose, and many polysaccharids. Alcoholic fermentation is extremely weak, and this is somewhat augumented by the presence of tannin up to three per cent. Tannin is fermented, but the curve of the production of tannase does not correspond with the curve of growth. Alcohol and glucose are converted in part to oxalic and acetic acid. As a source of nitrogen amino acids such as asparagin and tyrosin are most usable, ammonium salts of organic and inorganic acids serve fairly well, while nitrites and nitrates inhibit development.

729. BIGELOW, W. D. **Problems of canning operations.** Amer. Jour. Public Health **8:** 212–216. 1918.

730. HORN, J. S. **The importance of pure culture work in industrial processes.** Abst. Bact. **2:** 7. 1918.

731. NELSON, V. E., AND A. J. BECK. **By-products of the fermentation of cabbage.** Jour. Amer. Chem. Soc. **40:** 1001–1005. 1918.—A complete description of methods of estimation is reserved for future publication. Cans of fermented cabbage were bought on the market. The material was finally comminuted, made slightly acid to congo red with sulphuric acid, and subjected to steam distillation until two liters were obtained. The volatile acid was

determined by titration with barium hydroxide and the alcohols and esters redistilled from two-thirds of the original distillate until 50 cc. were obtained. This last "flavor" solution was saponified with 10 cc. of 20 per cent potassium hydroxide and the alcohols distilled off, the acids of esters being now obtained as potassium salts. After decomposition with dilute sulphuric acid and distillation these were titrated with barium hydroxide. The free acids and those obtained from ester saponification and alcohol oxidation were subjected to the Duclaux method of analysis. The alcohols had previously been concentrated by distillation by means of potassium dichromate in sulphuric acid. Acetic and proprionic acids form the main volatile portion, although formic acid was twice isolated, volatile acidity representing a considerable portion of the total. It was concluded that the fixed acidity was due to inactive lactic acid. Alcohols of the same extent as volatile acids were found and these consist of ethyl and propyl alcohol. Esters contribute to the flavor and aroma.

732. YOUNG, V. H. **Some factors affecting inulase formation in Aspergillus niger.** Plant World 21: 114–133. 1918.—Upon ascertaining that cultures of *Aspergillus niger* grew well on inulin and came to fruiting somewhat earlier than those on soluble sugars the author proceeded to determine some relations of this fungus to inulase production. The enzyme was found to be secreted under all conditions studied, but in greatest amount at the time of sporulation. The presence of inulin in the culture medium stimulates inulase production, yet the enzyme is produced in the presence of other carbohydrates, those more closely related to inulin being apparently more efficient in stimulation. The quantity of inulin in the medium is a factor affecting the amount of the enzyme secreted, yet there is no close proportionate relation. The production of the enzyme is not a starvation phenomenon.

733. OSTERHOUT, W. J. V. **The determination of buffer effects in measuring respiration.** Jour. Biol. Chem. 35: 237–240. *Fig. 1.* 1918.—In connection with the indicator method of measuring respiration it is often necessary to measure the buffer of reagents added. The author has constructed an apparatus consisting of a capillary tube connected by rubber tubing to two Y-tubes, one arm of which is connected in turn with thistle-tubes, the other arms acting as inlet and outlet for gases, thus permitting the addition of measured quantities of CO_2 to the liquid whose volume and P_H is known or which may be determined after the addition of the CO_2.

734. BIOLETTI, F. T., AND F. C. H. FLOSSFEDER. **Topping and pinching vines.** California Agric. Exp. Sta. Bull. 296: 369–384. *Fig. 1–3.* 1918.—The experiments reported in this publication point clearly to an ultimate injury to the vigor of certain types of grapes grown under the conditions mentioned when the practice is continued year after year. It is pointed out that under conditions of excessive vigor of growth the control of development by pinching and topping may not prove so injurious. The topping practised consisted in cutting off one or more feet of growing shoot during summer or autumn while the pinching process involves removal with thumb and fore finger of the extreme tips of growing shoots in late spring and early summer. The processes had been supposed to be decidedly advantageous. [See Bot. Absts. 1, Entry 1655.]

735. WOLF, F. A. **Intumescences, with a note on mechanical injury as a cause of their development.** Jour. Agric. Res. 13: 253–260. *Pl. 18–19, fig. 1.* 1918.—After a brief review of the reported causes of intumescences on plants the author is inclined to accept the view of Fischer based on colloid water relations in an acid medium and he presents observations and experiments to show that wind-blown sand may induce intumescence of cabbage leaves. The over growth of cells is considered to be related to absorption and probably due to intensified hydration of the cell colloids in the presence of increased acid content as a result of oxidation. [See Bot. Absts. 1, Entry 648.]

736. LOEB, J. **Chemical basis of correlation. I. Production of equal masses of shoots by equal masses of sister leaves in Bryophyllum calycinum.** Bot. Gaz. 65: 150–174. *Fig. 1–18.*

1918.—Pursuing further his studies in regeneration and correlation with *Bryophyllum* the author has sought to determine by many and varied experiments if equal masses of sister leaves in the same time and under similar conditions produce approximately equal masses of shoots. Such a law of mass relations was established. It was found, furthermore, that these mass relations hold although the number of shoots may differ. Leaves which had been cut into parts or reduced in mass yielded a proportionate decrease in the mass of shoots. It is believed that the absorption of water is necessary to initiate growth and therefore when leaves are suspended in moist air those grow out first which by location or other accidental occurrence obtain first the adequate water supply. [See Bot. Absts. 1, Entry 68.]

737. Saito, K. **Die Parthenosporenbildung bei Zygosaccharomyces und ihre Abhängigkeit von der Temperatur.** Bot. Mag. **32**: 26–27. 1918.—Parthenospores in species of *Zygosaccharomyces* have been known and the author attempts to determine the conditions under which such spores are produced. It is shown that by constant incubation at temperatures of 33–35°C. only parthenospores are produced. The behaviour of these organisms in respect to temperature is therefore analogous to that of certain Thallophytes and higher plants.

738. Hayden, J. L. R., and C. P. Steinmetz. **Effect of artificial light on the growth and ripening of plants.** Gen. Elec. Rev. **21**: 232. 1918.—The growth and ripening of string beans under Mazda electric lamps was compared with the same under natural conditions. The fruit ripened in a little more than half the time required under daylight alone.—*Zeller (St. Louis).*

739. Toda, Yasumochi. **Physiological studies on Schistostega osmundacea (Dicks.) Mohr.** Jour. Coll. Sci. Imp. Univ. Tokyo **40** (Art. 5): 1–30. *Pl. 1–2.* 1918.—This luminous moss occurs in small caves where the light intensity is considerably reduced and the optimum intensity is found to be 0.02–0.002 (Bunsen's unit), the protonema continuing to thrive, however, at 0.0008. The plant does not grow in places where the intensity of light is over 1. Related to assimilation in a feeble light seems to be the spherical cell of the protonema. Next to white light the moss thrives best in the blue and violet region of the spectrum. For shoot development the optimum temperature is 16 to 25°C. and the optimum humidity 90 to 100. The plant is stimulated by a relatively high content of calcium salts in the medium and Marchal's solution is a favorable cultural medium.

740. Buchanan, R. E., G. E. Thompson, P. F. Orr and E. M. Bruett. **Notes on conditions which influence thermal death points.** Abst. Bact. **2**: 5. 1918.

741. Bushnell, L. D. **The influence of cold shock in the sterilization of canned foods.** Jour. Ind. and Eng. Chem. **10**: 432–436. 1918.—A report of numerous experiments on the value of the "blanching" process and of small amounts of sodium chloride, acetic acid, and other factors in reducing the time necessary for the proper sterilization or "processing" of canned foods. In general the results show that cold shock or rapid cooling is of practically no value, and similarly a small amount of salt is ineffective, while a small amount of acetic acid promotes a more rapid sterilization.

742. Levine, M. **The physiological properties of two species of poisonous mushrooms.** Mem. Torr. Bot. Club **17**: 176–201. *Pl. 1–2.* 1918.—In this study no attempt was madeto isolate the toxic constituents of the fungi employed, but attention was confined wholly to the general physiological effects of infusions of *Panaeolus venenosus*, *P. retirugis* and, by comparison, *Agaricus campestris*. Such experiments have become important as a result of relatively recent cases of poisoning arising from the use of species of *Panaeolus* growing on mushroom beds. The experiments include the effect (1) of infusions injected into or fed to guinea pigs and rabbits, (2) on the heart beat and blood pressure of a cat, (3) on the gastrocnemius of the frog and (4) on the sciatic and vagus nerves of the frog. [See Bot. Absts. 1, Entry 421.]

743. Noyes, H. A., and L. Yoder. **Effect of carbon dioxide gas on bacterial numbers, ımmonification, and nitrification.** Abst. Bact. 2: 3. 1918.

744. Steinberg, R. A. **A study of some factors influencing the stimulative action of zinc ;ulphate on the growth of Aspergillus niger. 1. The effect of the presence of zinc in the cultural lasks.** Mem. Torr. Bot. Club 17: 287–293. 1918.—Special attention is drawn to the com-)osition of the cultural flask itself and data are produced showing that *Aspergillus niger* ıttains a greater growth in Jena glass than in Kavalier Bohemian or in Pyrex. On adding ;mall quantities (2.5 mgm. zinc per cubic centimeter) of zinc sulphate to cultures in the two vares last mentioned a similar increased growth amount is obtained. It is shown to be ;xtremely probable that the increased growth in Jena flasks is due to the presence of zinc n this glass–the occurrence of zinc in Jena glassware being established by the work of others.

745. Harper, R. A. **The evolution of cell types and contact and pressure responses in ?ediastrum.** Mem. Torr. Bot. Club 17: 210–240. *Fig. 1–27.* 1918.

746. Morita, K. **Influences de la pollinisation et d'autres actions extérieures sur la leur des Cymbidium virens, Lindl.** Bot. Mag. 32: 39–52. *Fig. 1–10.* 1918.—A study was made ıf the influence of (1) pollination on the period of flowering and appearance of the flower, 2) of dead pollen and pollen extract, (3) such mechanical stimuli as grains of sand and njury, (4) of saprophytic fungi such as *Aspergillus*, *Mucor*, and *Penicillium*, (5) of foreign ıollen, (6) chemical agents. It is shown that pollination prolongs the period of flowering .nd closes the stigma as well as producing growth influences in the gynoecium. Dead pollen .nd aqueous pollen extracts affect only the closing of the stigma. No effect is produced by ıechanical injury. The pollen of certain other orchids affects markedly the closing of the tigma, while that of many species has no action whatever. The effects of certain organic cids and sugars remain more or less doubtful.

747. Norton, J. B. S., and C. E. Leathers. **Conditions detrimental to seed production.** Iaryland Agric. Exp. Sta. Bull. 216: 175–226. 1918.—Brief notes are given on the factors ıfluencing the setting of fruit and the productions of seed in the chief crop plants. An xtensive bibliography is included. [See Bot. Absts. 1, Entry 628.]

748. Winslow, C.-E. A., and B. Cohen. **The distribution and relative viability of B. oli and B. aerogenes in water.** Abst. Bact. 2: 4. 1918.

749. Ramsey, G. B. **Influence of moisture and temperature upon infection by Spongospora ubterranea.** Phytopath. 8: 29–31. 1918.—A greenhouse experiment showing that infection y this fungus is practically restricted to cool, moist conditions. [See Bot. Absts. 1, Entry 35.]

750. Paine, S. O., and L. M. Saunders. **Note on a peculiarity exhibited by the testa f wrinkled peas.** Ann. Bot. 32: 174. 1918.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. Schramm, *Editor*

[Unsigned abstracts are by the editor.]

GENERAL

751. Burnham, Stewart H. **The flora of Indian Ladder and vicinity: together with escriptive notes on the scenery.** Torreya 18: 101–116, 127–149. *Fig. 1–9.* 1918.—Repre-entatives from all groups of non-vascular cryptogams are included in the present paper. *ecanora cerina siderites* (*Placodium cerinum siderites* Tuck.) appears as a new combination.

BRYOPHYTES

752. Brotherus, V. F. **Contributions to the bryological flora of the Philippines. V.** Philip. Jour. Sci. (Bot.) 13: 201–222. 1918.—One hundred seventy-two species are enumerated, 18 of which are proposed as new. New species of the following genera are described: Barbella, 1; Dicranoloma, 2; Ectropothecium, 1; Eriopus, 1; Fissidens, 1; Garovaglia, 2; Gymnostomiella, 1; Leskeodon, 1; Meiothecium, 1; Pseudopohlia, 1; Rhaphidostegium, 1; Sematophyllum, 1; Taxithelium, 3; and Trichosteleum, 1.—*Wm. H. Brown.*

753. Coker, Dorothy. **Revision of the North American species of Eucalypta.** Bull. Torr. Bot. Club 45: 433–449. *Pl.* 13–14. 1918.—Miss Coker has studied intensively the North American species of the genus Eucalypta Schreb., reducing the 17 species in Engler & Prantl to 8, except as *E. lacera* Ren. & Card. is left doubtful, no material of it being available for study. Synonymy, distribution and figures of each accepted species are given and some of the variant forms are distinguished as varieties. All species accepted are boreal and were originally described from Europe.—*A. Le Roy Andrews.*

754. Dixon, H. N. **The mosses collected by the Smithsonian African Expedition, 1909–1910.** Smithsonian Misc. Coll. 69^2: 1–28. *Pl. 1–2.* 1918.—Forty-eight species are listed, collected by Dr. Edgar A. Mearns in British East Africa, mostly on Mt. Kenia. They include new species in Sphagnum, Hymenostylium, Leptodontiopsis, Rhacomitrium, Bryum, Philonotis, Breutelia, Polytrichum, Hygroamblystegium, Calliergon, Isopterygium, Rhynchostegiella. The occurrence of boreal species on the higher mountains of equatorial Africa is discussed.—*A. Le Roy Andrews.*

755. Dixon, H. N. **Uganda mosses collected by R. Dümmer and others.** Smithsonian Misc. Coll. 69^3: 1–10. *Pl. 1.* 1918.—Twenty-seven species of mosses are enumerated, of which 8 are figured and described as new. The latter are placed in the genera Brachymenium, Pilotrichella, Cyathophorum (a genus not hitherto known from Africa), Rhacopilum (2), Lindbergia, Thuidium, Ectropothecium.—*A. Le Roy Andrews.*

756. Frye, T. C. **Illustrated key to the western Sphagnaceae.** Bryologist 21: 37–48. *Pl. 17–23.* 1918.—The area covered is from the Rocky Mountains to the Pacific Ocean and from the northern boundary of Mexico to the Arctic Ocean. Twenty-four species and two varieties are included, with key for identification and illustrations of all but one species. The figures bring out the points of diagnostic value, especially the outline and relative size of the stem-leaf, the section of the branch-leaf and the characters of the individual hyaline cell of the branch-leaf.—*A. Le Roy Andrews.*

757. Luisier, A. **Les mousses de Madère.** Broteria 16: 29–48, 49–83. *1 pl.* 1918.—A continuation of an historical introduction to Madeiran bryology published in 1917. Special attention is given to the relationship between the flora of Madeira and that of the other Atlantic Islands, with careful examination of all previously published records. The present list includes an extensively annotated list of species from Sphagnum to Barbula with localities and critical notes. One plate illustrates certain species discussed. One new form in Campylopus, and one new combination in the same genus, appear.—*E. B. Chamberlain.*

758. Potier de la Varde, R. **Ptychomitrium subcrispatum Thér. et P. de la V. (spec. nov. natalensis).** Rev. Gén. Bot. 30: 65–69. *Pl. 17.* 1918.—This new species from Natal, South Africa, is described and figured in detailed comparison with *P. crispatum* (H. & Grev.) Schimp.—*A. Le Roy Andrews.*

759. Röll, J. **Vierter Beitrag zur Moosflora des Erzgebirges.** Hedwigia 60: 12–49. 1918.—The article consists mostly of lists of species and forms of Sphagnum, together with some notes upon other characteristic mosses.—*A. Le Roy Andrews.*

760. THÉRIOT, I. **À propos du Braunia diaphana (C. M.) Jaeg. et du Leucodon sekistos Welw. et Duby.** Bull. Soc. Bot. Genève 9: 135–136. 1917.—*Braunia diaphana* belongs to the section Eubraunia, being a close relative of *B. Schimperiana*. *Leucodon sekistos* is completely synonymous with *Braunia diaphana*.—*E. B. Chamberlain.*

761. WILLIAMS, R. S. **Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906.** Torreya 18: 210–211. 1918.—Nine species of lichens and six of mosses are listed from the north shore of Grant Land. [See Bot. Absts. 1, Entry 762.]

LICHENS

762. WILLIAMS, R. S. **Some farthest north lichens and mosses of the Peary Arctic Expedition to Grant Land in 1906.** Torreya 18: 210–211. 1918. [See Bot. Absts. 1, 761.]

ALGAE

763. CROW, W. BERNARD. **The classification of some colonial Chlamydomonads.** New Phytol. 17: 151–159. *Fig. 1–2.* 1918.—The ordinal name Chlamydomonadales is suggested for the unicellular forms of the Isokontae, exclusive of certain ones regarded as reduced from filamentous forms. Among the motile members, the author recognizes the Sphaerellaceae as distinct from the Chlamydomonadaceae, but considers the two as closely related lines of ascent. The two groups are contrasted as to character of cell wall, presence or absence of pits, number and distribution of contractile vacuoles, and character of chloroplast. Among the motile colonial forms the author does not regard resemblance in general type of the coenobia as indicative of affinity; for the classification of these forms he turns to cell structure. On this basis, Volvox and Stephanosphaera are classed with Sphaerella in the Sphaerellaceae, while the remaining motile coenobic genera are grouped with Chlamydomonas in the Chlamydomonadaceae. The author, furthermore, does not regard the extreme differentiation of the coenobium of Volvox into reproductive and vegetative cells as the climax of the differentiation apparent in Pleodorina (Eudorina). Some material of *Pandorina morum* is reported upon in which many colonies showed from one to four cells, usually grouped near one end of the coenobium, which were much smaller than the rest and very poor in food material. These cells were not observed to divide, although in some cases the larger cells of the colonies were seen in division. This differentiation into vegetative and reproductive cells the author believes to have arisen independently in Volvox and Pandorina and that it represents in both cases "a fulfilment of the general tendency towards division of labor."

764. HODGETTS, WILLIAM J. **Uronema elongatum, a new freshwater member of the Ulotrichaceae.** New Phytol. 17: 159–166. *Fig. 1–11.* 1918.—The species is described from Birmingham, England. Details of cell structure, zoospore-formation and germination, attachment, and cell division are given. The author favors the retention of Uronema as a separate genus rather than to include it in Ulothrix, as suggested by Gaidukov.

765. HOWE, MARSHALL A. **The marine algae and marine spermatophytes of the Tomas Barrera Expedition to Cuba.** Smithsonian Misc. Coll. 68[11]: 1–13. *1 fig.* 1918.—The present list embraces 65 named species of algae and 4 referred to genus only. It is the most extensive list of Cuban algae thus far published and includes a considerable number of species believed to be attributed to Cuba for the first time. *Phormidium Hendersonii* is described as new. *Sarcomenia filamentosa* M. A. Howe, previously known only from the Florida type specimens, appears in the list. Notes on habitat and collections accompany the species. Two spermatophytes, *Halophila baillonis* Asch. and *H. Engelmannii* Asch., are included in the list.

766. Moore, George T. **Algological notes. III. A wood-penetrating alga, Gomontia lignicola, n. sp.** Ann. Missouri Bot. Gard. 5: 211-224. *Pl. 13-15.* 1918.—The new species is described from fresh water on the island of Nashawena, near Woods Hole, Massachusetts. The filaments are usually unbranched, rarely somewhat branched, with the striking characteristic of having most of the chlorophyll concentrated in the terminal cell (and in the spore from which the filament develops in case the former is still attached), the remaining cells being almost colorless. Of importance are the observations on the zoospores. Bornet and Flahault in *G. polyrhiza* reported biciliate zoospores of two sizes (without, however, observing any conjugation), while Wille records zoospores from the same species with four cilia. The present author found only biciliate zoospores in *G. lignicola*, and these all of one size. No conjugation was observed, and the belief is expressed that the presence of quadriciliate and biciliate spores in Gomontia does not in itself justify the assumption sometimes made that the latter are gametes. The zoospores may directly produce vegetative filaments or they may enlarge greatly to form resting spores which at maturity have thickened walls and frequently "lamellate excrescences and protuberances, referred to by other authors as 'rhizoids.'" The resting spores may rest for months or even years but ultimately germinate by the formation of from one to four filaments. Neither akinetes nor aplanospores were found and the author suggests the possibility that the aplanospores described by Bornet and Flahault from *G. polyrhiza* were merely zoospores which failed to escape and later came to rest. Bodies considered by some algologists as akinetes are identified by the author with resting spores developed from zoospores.

767. Setchell, W. A. **Parasitism among the red algae.** Proc. Amer. Phil. Soc. 57: 155-172. 1918.—The author excludes in the present paper all obvious epiphytes and endophytes and considers only those forms which upon one or more of the criteria of probable parasitism, viz., penetration of host, reduction of thallus, and loss of color, appear to him as undoubted parasites. An extensive historical account, with bibliograpby, is followed, by an enumeration, by families, of parasitic species of red algae. The list includes 42 species belonging to 29 genera, the latter distributed among 10 families. Including nine species and four genera, all as yet unpublished, parasitic species are known only from 11 of the 21 usually recognized families of red algae. Of these the Gigartinaceae (with 5 genera and 12 species) and the Rhodomelaceae (with 9 genera and 17 species) contain one-half or over of the known genera and species of parasitic red algae. The point is brought out that of these known parasitic species over 80 per cent are parasitic on another member of the same family, 16 per cent on red algae not of the same family as the parasite, and only 4 per cent on algae (brown) other than red. Attention is called to the case reported by Osterhout of the production of a dwarf parasitic generation on tetrasporic plants of *Agardhiella tenera* from the contents of a tetrasporangium acting as a whole. The author speaks of the similarity of the condition existing in this instance and that obtaining in many species of parasitic red algae which likewise show a close systematic relationship to their hosts. [See Bot. Absts. 1, Entry 1376.]

FUNGI

768. Adams, J. F. **Keithia on Chamaecyparis thyoides.** Torreya 18: 157-160. *Fig. 1-2* 1918.—A new species, *Keithia Chamaecyparissi*, is described from Lakehurst, New Jersey. Previously described species have been reported on species of Juniperus, Thuja and Tsuga.

769. Arthur, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway. II. Aecidiaceae, exclusive of Puccinia and form-genera.** Amer. Jour. Bot. 5: 420-446. 1918. —The author includes detailed citations of collections and critical notes of 79 species included in 17 genera and here recorded on 116 hosts. Eight new species are described by Arthur and Holway, namely: *Ravenelia inquirenda, R. distans, R. bizonata, R. sololensis*, and *R. Mainsiana* on Mimosaceae; *Uromyces socius* on Loranthaceae; *U. illotus* on Fabaceae; and *U. Salmeae* on Carduaceae. The author also describes *Uropyxis Crotalariae* on *Crotalaria* sp.

and *Skierka Holwayi* on *Thouinidium* sp., the latter representing the first species of this genus to be recognized in the flora of North America. A description is given of *Pucciniosira Eupatorii* Lagerheim, which has previously been known only as an herbarium name.—*H. S. Jackson.*

770. Arthur, J. C. **Uredinales of Guatemala based on collections by E. W. D. Holway. III. Puccinia, exclusive of species on Carduaceae.** Amer. Jour. Bot. 5: 462–489. 1918.—The author gives detailed citations of collections and critical notes on 76 species occurring on 119 hosts distributed in 29 families. Descriptions of twelve new species of *Puccinia* are given. *P. infuscans*, *P. macra*, *P. Aegopogonis*, and *P. subdigitata* on Poaceae; *P. vergrandis* and *P. aucta* on Dilleniaceae; *P. obscurata* on Ammiaceae; *P. gilva* on Heliotropiaceae; *P. fuscata* on Lamiaceae; and *P. eximia* on Rubiaceae are described by Arthur and Holway. *P. degener* and *P. filiola* on Lamiaceae are described by [E. B.] Mains and Holway. The author transfers *Argomyces parilis* Arth. to *Puccinia*. The telial stages have been discovered for *Uredo circinata* Schw., *U. velata* E. & E., and *U. varia* Diet. and the species transferred to *Puccinia*. The full life history of *Aecidium tubulosum* Pat. & Gaill. and *Caeoma Arracacharum* Lindr. having been determined, new combinations based on these names are proposed and a full description of the latter given.—*H. S. Jackson.*

771. Atkinson, Geo. F. **Preliminary notes on some new species of agarics.** Proc. Amer. Phil. Soc. 57: 354–356. 1918.—New species, all from the eastern United States, are described of the following genera: Amanita, 2; Hypholoma, 2; Lactarius, 2; and one each of Lepiota and Pholiota.

772. Atkinson, Geo. F. **The genus Galerula in North America.** Proc. Amer. Phil. Soc. 57: 357–374. 1918.—Galerula (Karsten) is employed here in the broader sense of the genus with practically the same limits as those used by Murrill in 1917 in North American Flora. The genus name Galera (Quelet), 1872, is antedated by Galera (Blume) employed in 1825 for a genus of orchids. Atkinson gives here his conception of the limits of the genus, and presents a synopsis of the species of North America. Fifty-eight species are listed, including a considerable number hitherto undescribed. The paper represents a critical structural study of the genus.—*H. M. Fitzpatrick.*

773. Brown, W. H. **The fungi cultivated by termites in the vicinity of Manila and Los Baños.** Philip. Jour. Sci. (Bot.) 13: 223–229. 1918.—The principal species found in the Philippine termite nests are the same as those reported from Ceylon and other tropical countries. —*H. S. Yates.*

774. Burt, Edward Angus. **The Thelephoraceae of North America. IX. Aleurodiscus.** Ann. Missouri Bot. Gard. 5: 177–203. *Fig. 1–14.* 1918.—Fourteen species of Aleurodiscus are described for North America, seven of these being hitherto undescribed, and three representing transfers from other genera. Figures are given for each species.—*H. M. Fitzpatrick.*

775. Drechsler, Charles. **The taxonomic position of the genus Actinomyces.** Proc. National Acad. Sci. U. S. A. 4: 221–224. 1918.—A summary of results obtained from cultural studies of a large number of species and strains of Actinomyces, both saprophytic and parasitic. The author concludes that there is no "adequate reason why the genus should not be classed, in an unqualified manner, with the Hyphomycetes, as a Mucedineous group with tendencies toward an erect Isaroid habit." A more detailed and illustrated account is to appear shortly in the Bot. Gaz.

776. Graff, Paul W. **Philippine Basidiomycetes. III.** Bull. Torr. Bot. Club 45: 451–69. *Pl. 15.* 1918.—Preceding parts of this series were published in Philip. Jour. Sci. (Bot.) 8: 299–307. 1913. *Ibid.* 9: 235–254. 1914. This part is a check-list of rusts, smuts, and higher

basidiomycetes collected in the Philippine Islands. All the collections cited are preserved in the herbarium of the Bureau of Science, Manila. A list of synonyms accompanies the citation of each species. The citations include seven smuts, three rusts, and forty-five species or varieties of hymenomycetes or hymenomycetous lichens. *Polystictus tabacinus* var. *barbatus* (Murr.) and *P. tabacinus* var. *substygius* (Berk. et Br.) are given as new combinations for *Polystictus spadiceus* var. *barbatus* Graff and *Fomes spadiceus* var. *halconensis* Bres., respectively.—*H. M. Fitzpatrick.*

777. HARPER, EDWARD T. **Hypholoma aggregatum and H. delineatum.** Mycologia **10**: 231–234. *Pl. 12.* 1918.—These species discussed particularly from the standpoint of nomenclature. The fruit-bodies and spores are figured.—*H. M. Fitzpatrick.*

778. HEDGCOCK, GEORGE G., ELLSWORTH BETHEL, AND N. REX HUNT. **Piñon blister-rust.** Jour. Agric. Res. **14**: 411–424. *Pl. 54–57.* 1918.—A species of Cronartium native on species of Ribes and Grossularia in Colorado and Arizona is described as *C. occidentale* sp. nov. The aecidial stage is demonstrated to be a Peridermium on *Pinus edulis* and *P. monophylla*, and is given the form-name *Peridermium occidentale*. The essential differences between this rust and *C. ribicola* are shown in tabular form.—*H. M. Fitzpatrick.*

779. HOUSE, H. D. **Report of the State Botanist.** New York State Mus. Bull. 197: 7–110. 1917.—Announcement is made (p. 9–11) of the completion for the museum of 56 groups of edible and poisonous mushrooms cast in wax, being a part of the Peck Memorial Collection. On p. 16–19 is given a list of specimens of fungi added to the herbarium. Under the head of "New or interesting species of fungi, IV" (p. 25–51) is given an annotated list, new species being described of the following genera: Cercospora, 1; Coryneum, 1; Cryptospora, 1; Cryptosporium, 1; Dendrodochium, 1; Diplodia, 2; Eutypella, 1; Gloeosporium, 1; Leptosphaeria, 1; Massarinula, 1; Microdiplodia, 1; Phoma, 1; Ramularia, 1; Septoria, 3; Sphaeropsis, 3. A new variety of *Sphaerophragmium hystricinum* (Ell.) Sacc. is published. *Macrophoma ceanothi* (*Macrophoma peckiana* D. & H.) and *Sphaeropsis tulipastri* (*Sphaeropsis magnoliae* Ell. & Dearn.) appear as new names. *Microdiplodia paupercula* (*Diplodia paupercula* B. & Br.) and *Metasphaeria anthelmintica* (*Sphaeria anthelmintica* Cke.) are published as new combinations. In addition, a list of 119 species of New York fungi from the collections of C. H. Peck and the author is given, the identifications having been made by Saccardo. The new species and varieties of this collection were described by Saccardo in Ann. Mycol. **13**: 115–122. 1915, and Nuovo Gior. Bot. Ital. **23**: 185–197. 1916. They are indicated in the present report by distinctive type. [See Bot. Absts. 1, Entry 831.]

780. JACKSON, H. S. **The Ustilaginales of Indiana.** Proc. Indiana Acad. Sci. **1917**: 119–132. 1918.—A total of forty-seven species is recorded for the state. All available collections are listed with critical notes on many of the species. An index to hosts is included.—*H. S. Jackson.*

781. JACKSON, H. S. **The Uredinales of Indiana. II.** Proc. Indiana Acad. Sci. **1917**: 133–137. 1918.—The author records the occurrence in Indiana of fourteen species of rusts on as many hosts which have not been previously recorded in state lists. Partial synonomy and critical notes are given. (Supplementary to: Jackson, H. S. The Uredinales of Indiana. Proc. Indiana Acad. Sci. **1915**: 429–475. 1916.)—*H. S. Jackson.*

782. JACKSON, H. S. **The Uredinales of Delaware.** Proc. Indiana Acad. Sci. **1917**: 311–385. 1918.—The author lists all available collections and published records together with essential synonomy, critical notes and a detailed review of American culture work. A total of 129 species are recorded for the state, occurring on 232 host plants. *Aecidium Ivae* on *Iva ovaria* is described as new. *Coleosporium carneum* (Bosc.) comb. nov. is prepared to replace *Coleosporium Vernoniae* B. & C. Indexes of species and hosts are included.—*H. S. Jackson.*

783. MAYOR, EUG. **Contribution à l'étude de la flore mycologique des environs de Leysin.** Bull. Soc. Vaud. Sci. Nat. **52:** 113–149. 1918.—The author lists 170 species of parasitic fungi collected during July 1917 in the canton de Vaud, Switzerland, recording their occurrence on over 300 host plants. Critical notes and field observations are furnished for many of the species, particularly of the Uredinales, in which group 107 species are listed.—*H. S. Jackson.*

784. RHOADS, ARTHUR S. **Daldinia vernicosa—a pyroxylophilous fungus.** Mycologia **10:** 277–284. *Pl. 14.* 1918.—The writer's observations show this species to be a pyroxylophilous fungus, and common on burnt wood of dicotyledonous plants. This fungus and *D. concentrica* are briefly discussed and contrasted. The spores of both species are said to shed the exospore wall when mounted in dilute alkaline solutions, and spores exhibiting this phenomenon are figured.—*H. M. Fitzpatrick.*

785. SEAVER, F. J., AND W. T. HORNE. **Life-history studies in Sclerotinia.** Mem. Torr. Bot. Club **17:** 202–206. *Pl. 3.* 1918.—A species of Sclerotinia collected on the rootstocks of *Geranium maculatum* in Van Cortlandt Park, New York City, described as new under the name *Sclerotinia (Stromatinia) Geranii* sp. nov. The authors describe in detail culture work which shows that a species of Botrytis is the conidial stage. They state that the conidiophores were developed in pure culture from germinated ascospores. Both stages in the life history are figured.—*H. M. Fitzpatrick.*

786. SUMSTINE, D. R. **Fungi of Chautauqua County, New York.** New York State Mus. Bull. 197: 111–118. 1917.—A list, with brief notes on parasitic species, of 13 species of myxomycetes and 237 species of fungi.

787. TANAKA, TYOZABURÔ. **New Japanese fungi. Notes and translations. V.** Mycologia **10:** 285–288. 1918.—*Physalospora minuta* I. Miyake, *Ascochyta mori* I. Miyake, *Stagnospora mori* I. Miyake, *Robillarda mori* I. Miyake, *Cytodiplospora mori* I. Miyake, and *Dimerosporium mori* Y. Endô are listed together with English diagnoses and annotations. —*H. M. Fitzpatrick.*

788. TEHON, LEO. R. **Systematic relationship of Clithris.** Bot. Gaz. **65:** 552–555. *Pl. 9.* 1918.—Although the genus Clithris Fries is admitted to be of uncertain taxonomic relationships, facts are enumerated here which seem to show that it should be placed with the Phacidiales rather than with the Hysteriales. Colpoma Wallroth and Sporomega Corda are synonyms. Three new species are described on material collected by F. L. Stevens in Porto Rico: *Clithris clusiae*, *C. minor*, and *C. pardani.*—*H. M. Fitzpatrick.*

789. THAXTER, ROLAND. **New Laboulbeniales from Chile and New Zealand.** Proc. Amer. Acad. Arts and Sci. **54:** 207–232. 1918.—Diandromyces and Eudimeromyces appear as new genera, with *D. chilenus* and *E. chiliotis*, both from Corral, Chile, as the type species. New species, all from Chile, are described of the following genera: Dichomyces, 1; Cantharomyces, 4; Herpomyces, 1; Corethromyces, 2; Cucujomyces, 4. Laboulbenia, 2; Coreomyces, 2. From New Zealand, new species are described as follows: Monoicomyces, 1; Corethromyces, 3; Cucujomyces, 1. *Corethromyces andinus* (*Sphaleromyces andinus* Speg.) and *Cucujomyces elegantissimus* (*Stephanomyces elegantissimus* Speg.) appear as new combinations. The author gives critical notes on the three species of Cucujomyces described by Spegazzini and modifies the description of the genus by the latter who, it is stated, misinterpreted the antheridial characters.

790. YATES, H. S. **Fungi from British North Borneo.** Philip. Jour. Sci. (Bot.) **13:** 233–240. 1918.—Twenty-three species are enumerated, two of Meliola and one each of Hypocrea, Phaeodothiopsis, and Phyllosticta being proposed as new.—*Wm. H. Brown.*

791. ZINSSMEISTER, C. L. **Ramularia root-rots of ginseng.** Phytopath. **8:** 557–571. *Fig. 1–8.* 1918.—Two species of Ramularia are described as new *R. destructans* and *R.*

panacicola. These are parasitic on the roots of ginseng, apparently no other species of Ramularia ever having before been described as parasitic on roots of any host. Both species produce chlamydospores abundantly. [See Bot. Absts. 1, Entry 1034.]—*H. M. Fitzpatrick.*

MYXOMYCETES

792. SUMSTINE, D. R. **Fungi of Chautauqua County, New York.** New York State Mus. Bull. 197: 111–118. 1917. [See Bot. Absts. 1, 786.]

FLAGELLATES

793. SCHAEFFER, ASA A. **A new and remarkable diatom-eating flagellate, Jenningsia diatomophaga nov. gen., nov. spec.** Trans. Amer. Microsc. Soc. 37: 177–182. *Pl. 13.* 1918.—This new and exclusively holozoic member of the Euglenineae is described from near Knoxville, Tennessee. So far as observed the food of this flagellate consists entirely of living diatoms, which are captured in a truly predatory manner while moving. Locomotion, *structure of cell, asexual reproduction, and feeding habits are discussed.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

[Unsigned abstracts are by the editor.]

794. ASHE, W. W. **Additions to the arborescent flora of North Carolina.** Jour. Elisha Mitchell Sci. Soc. 34: 130–140. 1918.—The author records several additions to Coker and Totter's recently published "Trees of North Carolina." The additions include descriptions of a new species of *Hicoria*, two new species and one new variety of *Amelanchier*, and several new combinations.

795. BEAUVERD, GUSTAVE. **Esquisse synécologique comparative de deux marais des environs de Baulmes.** Bull. Soc. Vaud. Sci. Nat. 52: 17–93. 1918.—The author presents a general discussion of the flora of the region concerned, mainly from an ecological standpoint, gives a list of the species represented, and characterizes about a dozen new varieties and forms of endemic flowering plants.

796. BLAKE, S. F. **Further new or noteworthy Compositae. New spermatophytes collected in Venezuela and Curaçao by Messrs. Curran and Haman. New plants from Oaxaca.** [Three separate titles.] *Contrib. Gray Herb. Harvard Univ. New Ser. 53: 23–65. Pl. 1, fig. 1–14.* 1918.—In the first paper the author describes a new species of *Aphanostephus* from Texas, one of *Diplostephium* and one of *Verbesina* from Colombia, one of *Liabum* from Gautemala, and one of *Cirsium* from Oregon. New combinations appear under *Steiractinia* and *Gynoxis*. The second article records the results of a study of a collection of plants made in Venezuela and on the Island of Curaçao during the spring and summer of 1917. Seventeen species are described, distributed among several genera, and two genera are characterized as new to science, namely, *Hecatostemon* of the Flacourtiaceae and *Oxycarpha* of the Compositae. *Wikstroemia* Schrad. is recognized as a valid generic name and to it are transferred thirty-one species, mostly from *Haemocharis*, *Laplacea*, and *Lindleya*. Under the third title the author places on record the results of studies of a collection of plants made in Oaxaca, Mexico, by Messrs. Conzatti, Reko, and Makrinius in 1917. Thirteen new species of flowering plants, belonging to several different genera, are described, and one new genus (*Schismocarpus*) of the Loasaceae is proposed.

797. COCKERELL, T. D. A. **Notes on the flora of Boulder County, Colorado.** Torreya 18: 177–183. 1918.—Additions to the phanerogamic flora of Boulder County are listed with notes

on several species. *Heliomeris* of Nuttall is recognized as of generic rank, and to it are referred eight species and one variety. New combinations also occur under *Oxytropus*.

798. Heimlich, Louis Frederick. **The trees of White County, Indiana, with some reference to those of the state.** Proc. Indiana Acad. Sci. **1917**: 387–471. *Pl. 1–32.* 1918.—Sixty-two species of trees are recorded from White County, as contrasted with one hundred and twenty-five from the entire state. The paper is illustrated with distribution maps and several line drawings.

799. Macbride, J. Francis. **New or otherwise interesting plants, mostly North American Liliaceae and Chenopodiaceae.** Contrib. Gray Herb. Harvard Univ. New Ser. **53**: 1–22. 1918.—The present paper embodies the results incidental to a study of several collections of plants, chiefly from western North America. New species are described in *Tricyrtis*, *Atriplex*, *Lotus*, *Lomatium*, *Lycium*, and *Cirsum*. A few new varieties are also characterized, and several new combinations have been made, particularly in *Zygadenus*, *Atriplex*, *Madhuca*, and *Lycium*.

800. Piper, C. V. **New plants of the Pacific Northwest.** Proc. Biol. Soc. Washington **31**: 75–78. 1918.—Piper describes the following species as new to science: *Epilobium cinerascens*, *Vaccinium coccineum*, *Mertensia bella*, *Castilleja indecora*, *Grindelia Andersonii*, and *Hoorebekia curvata*.

801. Schneider, Camillo. **Notes on American willows. II. The species related to Salix glauca L.** Bot. Gaz. **66**: 318–353. 1918.—The present paper is concerned with a discussion of *Salix glauca* L. and its immediate allies, a group consisting of ten species, including two new ones (*S. fullertonensis* and *S. anamesa*), and several varieties.

802. Schönland, S. **A summary of the distribution of the genera of South African flowering plants.** Trans. Roy. Soc. S. Afric. **7**: 19–58. 1918.—This paper consists of an enumeration of the genera of South African flowering plants with brief notes on their geographical distribution.

803. Blake, S. F. **A revision of the genus Viguiera.** Contrib. Gray Herb. Harvard Univ. New Ser. **54**: 1–205. *Pl. 1–3.* 1918.—This paper is concerned not only with a revision of the genus *Viguiera*, but it includes a general discussion of the natural relationship of several closely related genera of helianthoid Compositae; and from rather extended comparative studies the author proposes a rearrangement of certain genera of this group. *Viguiera*, as here circumscribed, is made somewhat more inclusive than formerly understood, mainly by combining with it several species hitherto referred to *Gymnolomia*. The genus *Viguiera* is divided into three subgenera, namely *Amphilepis*, a group of twelve Mexican species, *Calanticaria*, to which are referred one hundred and twenty-four species ranging in distribution from the United States to Argentina and Brazil, and *Yerbalesia*, a small group of five species confined to Paraguay, Uruguay and adjacent Argentina. In addition to these there are two little known species of doubtful affinity. Altogether one hundred and forty-three species of *Viguiera* are recognized, and of these twenty-eight are new to science. Several new varieties are also described, and a relatively large number of new names and new combinations have been made, as would naturally result from a critical study of such a large and widely distributed group of plants. A list of the exsiccatae cited and a complete index of accepted names, synonyms, etc., add materially to the usefulness of the work.

804. Cockayne, L. **Notes on New Zealand floristic botany, including descriptions of new species, &c. (No. 3).** Trans. and Proc. New Zealand Inst. **50**: 161–191. *Pl. 9, 10.* 1918. —In addition to critical notes on New Zealand plants, new species are described in the following genera: *Carmichaelia*, *Cassinia*, *Epilobium*, *Haastia*, and *Veronica*.

805. Ferris, Roxana Stinchfield. **Taxonomy and distribution of Adenostegia.** Bull. Torr. Bot. Club **45**: 399–423. *Pl. 10–12.* 1918.—The author presents a revision of this west American genus, tracing its distribution from southeastern Montana and Washington to northern Mexico. Twenty-one species are recognized of which five are described as new to science.

806. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. IV, Part 4, *P. 93–110, pl. 140–143.* William Applegate Gullick: Sydney, *1918.*—This number contains descriptions and illustrations of *E. reduncа* Schauer, *E. accedens* W. V. Fitzgerald, E. *cornuta* Labill., and *E. Websteriana* Maiden. *Ibid.* Part 5, *P. 111–135. Pl. 144–147.* 1918. Contains descriptions and illustrations of *E. Lehmanni* Preiss, *E. annulata* Benth., *E. platypus* Hook., *E. spathulata* Hook., *E. gamophylla* F. v. M., and *E. argillacea* W. V. Fitzgerald.

807. Nieuwland, J. A. **Heterothrix (B. L. Robins.) Rydb. a synonym, and other notes.** Amer. Mid. Nat. 5: 224–225. 1918.—The author proposes the generic name *Pennellia* to replace *Heterothrix* Rydb., not Muell. Arg.

808. Pau, C., and C. Vicioso. **Plantas de Persia y de Mesopotamia.** Trab. Mus. Nac. Cienc. Nat. Madrid. Ser. Bot. Num. **14**: 1–48. *Pl. 1–5.* 1918.—The authors present a list of flowering plants and ferns, collected in 1899 in Persia and Mesopotamia; the list includes descriptions of about forty species and several varieties of flowering plants characterized as new to science.

809. Petrie, D. **Descriptions of new native flowering-plants.** Trans. and Proc. New Zealand Inst. **50**: 207–211. 1918. Four new species and one variety are described in *Myosotis*, one new species in *Pterostylis*, and one in *Poa*—all are from New Zealand.

810. Robinson, B. L. **I. Diagnoses and notes relating to tropical American Eupatorieae. II. A descriptive revision of the Colombian Eupatoriums. III. Keyed recensions of the Eupatoriums of Venezuela and Ecuador.** [Contrib. Gray Herb. Harvard Univ. New Ser., No. LV.] Proc. Amer. Acad. **54**: 235–367. 1918.—Article I contains descriptions of thirty-seven species and seven varieties of *Eupatorium* new to science; the species are distributed as follows: twenty-one from Colombia, seven from Venezuela, two from Mexico, two from Panama, and from Guatemala, Jamaica, Porto Rico, Santo Domingo and Ecuador one each. A new species of *Fleischmannia* and one of *Kuhnia* from Mexico are included. Article II consists of a critical revision of the Eupatoriums of Colombia. Ninety-three species and several varieties are recognized. The group is keyed to sections, and there is a key to the species of each section. A lucid description is given of each species, and this is followed by bibliography and the citation of exsiccatae. Article III is a similar presentation of the Eupatoriums of Venezuela and Ecuador. Thirty-four species are recognized from Venezuela and fifty from Ecuador.

811. Rolfe, R. A. **Gongora latisepala.** Curtis's Bot. Mag. *Pl. 8766.* 1918.—A new species of orchid indigenous to Colombia, described and illustrated from plants grown at the Royal Botanic Gardens, Kew, England.

812. Sargent, C. S. **Notes on North American trees. II. Carya.** Bot. Gaz. **66**: 229–258. 1918.—The author gives a conspectus of the species of hickory occurring in the United States, recognizing fifteen species and a number of varieties and forms several of which are new to science. An enumeration of the supposed hybrid hickories is also included and to some of these new binomial names have been assigned.

813. Schneider, Camillo. **Notes on American willows. I. The species related to Salix arctica. Pall.** Bot. Gaz. **66**: 117–142. 1918.—This paper is concerned with a discussion of *Salix artica* Pall. and its immediate allies, involving six species. Several new varieties and forms are characterized.